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LEIGHTON BROS.

MRS FORBES' HONEY-EATER.

(MYZOMELA ANNABELLÆ, *Scl.*)

DS 619
.F69
1885

A NATURALIST'S WANDERINGS

IN THE

EASTERN ARCHIPELAGO

A NARRATIVE OF TRAVEL AND EXPLORATION

FROM 1878 TO 1883

BY

HENRY O. FORBES, F.R.G.S.

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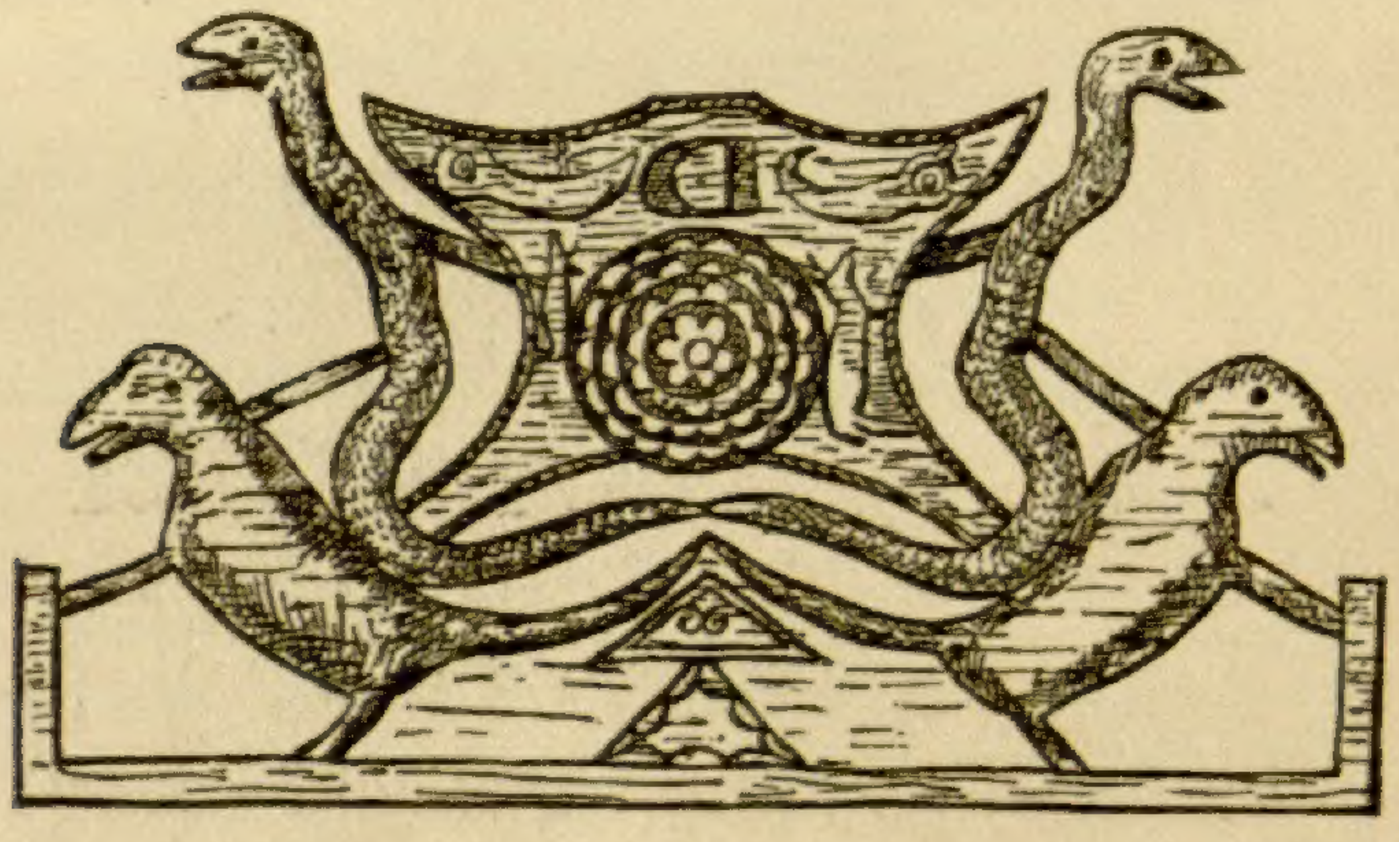
MEMBER OF THE ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND
MEMBER OF THE BRITISH ORNITHOLOGIST'S UNION

WITH NUMEROUS ILLUSTRATIONS FROM THE AUTHOR'S SKETCHES
AND DESCRIPTIONS BY MR. JOHN B. GIBBS



NEW YORK
HARPER & BROTHERS, FRANKLIN SQUARE
1885

MISSOURI BOTANICAL
GARDEN LIBRARY

TO

THE MEMORY

OF

MY FRIEND AND CLASS-FELLOW AT THE UNIVERSITY OF EDINBURGH,

William Alexander Forbes,

B.A., F.L.S., F.G.S., &c.,

FELLOW OF ST. JOHN'S COLLEGE, CAMBRIDGE;

PROSECTOR TO THE ZOOLOGICAL SOCIETY OF LONDON;

WHO DIED IN AFRICA IN JANUARY, 1883,

WHILE LEADING A SCIENTIFIC EXPEDITION ALONG THE RIVER NIGER;

AND WHO, ALREADY EMINENT FOR ENDURING WORK
ACCOMPLISHED IN ZOOLOGICAL SCIENCE,

WAS IN FUTURE PROMISE PRE-EMINENT OVER ALL OF HIS TIME,

This Volume is affectionately Dedicated,

PREFACE.

MR. A. R. WALLACE'S 'Malay Archipelago' is so accurate and exhaustive an account of the Eastern Isles, that there have been left but few gleanings for those who have followed him to gather. Most of the islands visited by me were also visited by him; but my route has in each island been altogether different from his. In as far as it refers to islands visited by both of us, I should desire this volume, which is a mere transcript of what I have thought the more interesting of the field notes made during my wanderings, to be considered in the light of an *addendum* to—unfortunately without any of the literary elegance and finish of—that model book of travel.

No detailed account of the Timor-laut Islands has appeared before the present; and very little has been published on the inhabitants of the interior of Timor.* In the chapters devoted to these lands I have contributed some ethnological notes which I trust may be found new and of interest.

Before I allow this volume to leave my hands, I have the pleasant task of acknowledging my indebtedness to many friends. Besides those whose kindness I have referred to in the body of this work, I have in the first instance to beg their Excellencies Van Lansberge and 'Sjacob, the two Governors-General of Netherlands India during my stay in the Archipelago, to accept my grateful acknowledgments for their many

* 'As Possessões Portugezas na Oceania, por Affonso do Castro, membro da Sociedade de Sciencias e Artes de Batavia; Deputado da nação, &c., ex-Governador de Timor: Lisboa, 1867,' contains an interesting account of some of the customs of the people of E. Timor.

generous concessions and the aid granted to me as a scientific traveller. My thanks are due also to all the civil officials—too numerous to name here—whose districts I resided in or passed through. They upheld the well-deserved fame that the Dutch-Indian *Ambtenars* have earned for their hospitality. The mention of each of their districts is indelibly associated in my remembrance with their names and their numerous acts of kindness. I may be permitted to record the names of those to whom I am under special obligation: Governor Laging Tobias, then Resident of Palembang; Assistant-Resident Schuylinburch, of Muara-dua; Controllers De Heer and Beyrinck, of the Lampong Residency; and Controllers Van der Volk, Hisgen, and Kamp, of the Palembang Residency.

To Dr. Treub and Dr. Burck, of the Botanical Gardens in Buitenzorg, I am peculiarly indebted for more than ordinary acts of courtesy and friendship; as well as to Dr. Bernelot Moens, Director of the Cinchona Plantations. To His Excellency Senhor Bento da França Pinto d' Oliveira, the Governor of Portuguese Timor, to his whole family, and to his son Senhor Bento da França Salema, Government Secretary, my wife and myself lie under the deepest indebtedness, not alone for the aid and protection I was so generously provided with to enable me to visit the interior of that interesting island, but for the most affectionate kindness manifested to us both throughout our stay in Timor.

To Mr. H. D. Jamieson, Mr. J. Craig and Mr. C. Haliburton, who did for us many acts of personal kindness and friendship while in Java, I tender my sincerest thanks.

I have to express my very hearty obligations to the British Association's Committee for the exploration of Timor-laut, especially to Dr. P. L. Sclater; to Mr. Carruthers and the Botanists of the British Museum for their aid in arranging Timor Herbarium, and for their describing it in time to appear as one of the appendices of this volume; to Messrs. S. O. Ridley and J. Quelch, of the Zoological Department;

and to Mr. R. Bowdler Sharpe for his kind revision of the proof sheets of the ornithological lists, as well as for his willing aid in the determination of the birds I obtained.

It was Mr. H. W. Bates, the Author of the 'Naturalist on the Amazons,' who in my boyhood first inspired me with a desire to visit the tropics; and he, in later years, has ever with ready cheerfulness aided my inexperience by sound and friendly advice.

Lastly but chiefly, I must acknowledge a heavy debt of gratitude to my friend Alexander Comyns, LL.B., of the Middle Temple, for more acts of kindness, as my constant correspondent and counsellor during my absence, than can be ever sufficiently acknowledged or repaid.

I cannot close without adding one word of recognition of the companion of my travels, whose constant encouragement and valued aid lighten all my labours.

HENRY O. FORBES.

RUBISLAW DEN, ABERDEEN,
January 30, 1885.

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Malacca
Siak
Natuna Islands
Great Natuna I.
S. Natuna Islands
Tambelan Islands
Nias Strait
Nias
Si Birui Strait
North Point of Si Birui
Mantawi Islands
Nassau Islands
Banca
Billiton I.
Pulo Laut
Pulo Bunguran
Anambas Is.
Linga I.
Singkep I.
Pulo Tioman
Pulo Aor
Pulo Pinang
Pulo Brasalla
Pulo Jahang
Pulo Lingin
Pulo Tambelan
Pulo Subi
Pulo Laut
Pulo Sebetik
Pulo Sebetik Besar
Pulo Sebetik Kechil
Pulo Sebetik Tengah
Pulo Sebetik Utara
Pulo Sebetik Selatan
Pulo Sebetik Barat
Pulo Sebetik Timur

PART I.

IN THE COCOS-KEELING ISLANDS.

A NATURALIST'S WANDERINGS

IN THE

EASTERN ARCHIPELAGO.

CHAPTER I.

IN BATAVIA AND BUITENZORG.

Arrival in Batavia—First impressions—Buitenzorg and its Botanical Gardens.

On the 8th October, 1878, I embarked at Southampton on board the Royal Dutch Mail steamer *Celebes*, for Batavia, on a long-dreamt of visit to the tropical regions of the globe. There is little of interest or novelty to record nowadays of a voyage to the East. The most stay-at-home is familiar with this ocean highway.

The home-come traveller, however, will be pleased to be reminded of that pleasant picture nestling between the Burlings and the Arabida hills—the stupendous and useless convent of Mafra, the sharp turrets and bristling peaks of Cintra, and the flashing towers and white buildings of Lisbon, rising from the banks of the river. Notwithstanding all I had read of Wallace and of Bates, I was going out full of extravagant ideas of tropical blossoms; and had little idea, as I rounded the cape of Gibraltar, leaving to the north of me purple hills of heather, scarlet fields of poppies, and rich parterres starred with cistus and orchids, with anemones and geraniums, and sweet with aromatic shrubs and herbs, that I would encounter nothing half so rich or bright amid all the profusion of the "summer of the world."

It will please him to have recalled the Straits of Messina,

bathed in sunlight, its little villages with their olive groves and vineyards slumbering at the mouth of chasm-like gorges, winding away up amongst the mountains which ruggedly overshadow them.

In crossing the Mediterranean, we gave a lift to tired wag-tails and swallows, to a goat-sucker and a fly-catcher, and carried them into Port Said. The squalor of that town, the barrenness of the canal shores and the arid bareness of Aden were a splendid offset to the verdure just ahead of us. In the Indian Ocean our friendly yard-arms gave a rest to several bee-eaters (*Merops philippinus*), to a chat and to little flocks of swallows before we sighted the Maldive and Laccadive coral Archipelagoes. Far ahead on the horizon their islets looked like a group of bouquets set in marble-rimmed vases; but as we approached, the vase rims changed into the surf of the sea breaking on the reef to feed its builders, and the bouquets into clumps of cocoa-palms, iron-wood, and other trees which the currents of the sea have washed together, and the passing winds and wandering birds have carried thither to deck these lone homes of the ocean fowl, which came fighting in our wake for the scraps that fell from our floating table.

Holding on east by southward for a few days more, a hazy streak appeared on our horizon, and my eyes rested on the first of the Malayan islands—on the distant peaks of Sumatra. We anchored at Padang for a day, and, in sailing southward along its coast, I could not admire sufficiently the magnificence of that island—its great mountain chain running parallel to the coast, and rising into smoking peaks, clad with forest to the very crater rims,—which later I found to be all that I had pictured it from the sea, and more.

On the morning of the second day, we entered the Sunda Straits, that narrow water-pass by the opening of which between Java and Sumatra, Nature has laid under grateful tribute all Cape-coming and -going mariners through the Java Sea to and from the Archipelago or Chinese ports. Dotted about in this narrow channel, were low picturesque islands and solitary cones of burnt-out craters, towering sheer up to a height of from two to three thousand feet, all clothed in vegetation. Prominent among the latter stood out the sharp cone of Krakatoa, whose name will scarcely be forgotten by our generation at least, and

will live longer in the sorrowful remembrance of the inhabitants of the shores of the strait. The appalling catastrophe of August the 27th, 1883, would, however, sink into insignificance, if compared with that which, while this was still an undiscovered sea, must have withdrawn the foundations of the land over which the strait now flows.

On our right the Java coast lay in a series of beautiful amphitheatre slopes, laid out in coffee-gardens and rice-terraces; on our left were the more distant Sumatra shores cut into large and beautiful bays between long promontories, on the easternmost of which stood out the high dome of Raja-basa. Rounding St. Nicholas Point, we sailed eastward among the tree-capped Thousand Islands. The coast of Java, on our right, presented a singular appearance, for, for miles into the interior it seemed elevated above the level of the sea scarcely more than the height of the trees that covered it. Nothing could be seen save the sea fringe of vegetation in front of a green plain, behind which rose the hills of Bantam and the Blue Mountains, as the old mariners called the peaks of Buitenzorg.

Late in the afternoon of the 17th of November, the *Celebes* dropped her anchor in Batavia Roads, one of the greatest centres of commerce in all these seas, amid a fleet flying the flags of all nations. I had reached my destination; but, scan the shore as I might, I failed to detect anything like a town or even a village, only a low shore with a fringe of trees whose roots the surf was lazily lapping. As we approached the land in the steam tender, into which we were at length transferred, the shore opened out, and disclosed the mouth of a canal, leading to the town a long mile inland. A traveller, dropped down here by chance, might, from these canals, make a very good guess at the nationality of the dominant power in the island, for these placid water-roads are as dear to the heart of the Hollander as heather-hills to a Highlander.

On stepping off the mail, I said good-bye to western life and ways, and entered on others new and strange to me, exciting my curiosity, full of fascination, even bewildering, recalling the confused sensations of my first boyish visit to the capital. Even in the canal, the first aspects of life were intensely interesting. Here and there a fishing-boat passed

us, novel in cut and rig, decked with flowers at the prow, rowed out to sea by some ten or twelve dusky fishers, singing an intermittent song, timed to the rattle of their heavy oars in the rowlocks; a little further on, we glided past a fleet of gaily painted craft, Malay, Chinese, and Arab, lying at anchor under the canal wall, their occupants, in bright-coloured calicoes, lounging in unwonted attitudes about their decks.

Before we had moored by the side of the Custom-house, it was quite dark, so that our landing was effected under some difficulty, amid the usual and necessary din and confusion, and amid a very Babel of foreign tongues, of which not a syllable was intelligible to me, save here and there a Portuguese word still recognisable, even after the changes of many centuries—veritable fossils bedded in the language of a race, where now no recoliection or knowledge of the peoples who left them exists.

By dint of the universal language of signs, I got myself and baggage at last transferred to a carriage, drawn by two small splendidly running ponies, of a famous breed from the island of Sumbawa. After a drive of between two and three miles, through what seemed an endless row of Chinese bazaars and houses, remarkable mostly, as seen in the broken lamplight, for their squalor and stench, before which their occupants at smoking and chatting, I at length emerged into a more genial atmosphere, and into canal and tree-margined streets, full of fine residences and hotels, very conspicuous by the blaze of light that lit up their pillared and marbled fronts.

Taking up my quarters at the Hotel der Nederlanden, I had to be content with an uncurtained shake-down on the floor of the room of one of my fellow passengers, as every bed in the hotel was occupied. Next morning, to every one's surprise, I arose without a single mosquito bite, evidently mosquito-proof. To my unspeakable comfort and advantage, I remained absolutely so during my whole sojourn in the East, and was thus relieved of the necessity of burdening myself with furniture against these, or any other insect pests whatever.

When the chaotic confusion of my first impressions of Batavia had become reduced to order, I found that it consisted of an old and a new town. The old town lies near the strand; is close, dusty, and stifling hot, standing scarcely anything

above the sea-level. It contains the Stadthouse, the offices of the Government, with the various consulates and banks, all convenient to the wharf and the Custom-house, situated along the banks of canals, which intersect the town in every direction. Round this European nucleus cluster the native village, the Arab and the Chinese "camps."

Of Chinamen, Batavia contains many thousands of inhabitants, and, without this element, she might almost close her warehouses, and send the fleet that studs her roads to ride in other harbours; for every mercantile house is directly dependent on their trade. They are almost the sole purchasers of all the wares they have to dispose of. They rarely purchase except on credit, and a very sharp eye indeed has to be kept on them while their names are on the firm's books, for they are invete-rate, but clever scoundrels, ever on the outlook for an oppor-tunity to defraud. In every branch of trade, the Chinaman is absolutely indispensable, and, despite his entire lack of moral attributes, his scoundrelism and dangerous revolutionary ten-dencies, he must be commended for his sheer hard work, his indomitable energy and perseverance in them all. There is not a species of trade in the town, except, perhaps, that of bookseller and chemist, in which he does not engage. Many of them possess large and elegantly fitted up *tokos* or shops, filled with the best European, Chinese, and Japanese stores; their workmanship is generally quite equal to European, and in every case they can far undersell their Western rivals.

The Arab, who like the Chinaman is prevented because of his intriguing disposition from going into the interior of the island, does, in a quiet and less obtrusive way, a little shop-keeping and money-lending, but is oftener owner of some sort of coasting craft, with which he trades from port to port, or to the outlying islands.

The natives of the town—that is, coast Malays and Sun-danese—perform only the most menial work; they are vehicle drivers, the more intelligent are house servants, small traders, and assistants to the Chinese, but the bulk are coolies. They have no perseverance, and not much intelligence; and are very lazy, moderately dishonest, and inveterate gamblers, but otherwise innocuous.

This was the Batavia — fatal-climated Batavia — of past

days. In this low-lying, close and stinking neighbourhood, devoid of wholesome water, scorched in the daytime, and chilled by the cold sea fogs in the night, did the Eastern merchant of half-a-century ago reside, as well as trade. Out of this, however, if he survived the incessant waves of fever, cholera, small-pox, and typhoid, he returned home in a few years, the rich partner of some large house, or the owner of a great fortune.

All this is changed now. Morning and evening, the train whirls in a few minutes the whole European population—which tries, in vain, to amass fortunes like those of past times—to and from the open salubrious suburbs, the new town, of fine be-gardened residences, each standing in a grove of trees flanking large parks, the greatest of which, the King's Plain, has each of its sides nearly a mile in length. Here the Governor-General has his official Palace—his unofficial residence being on the hills at Buitenzorg, about thirty miles to the south of Batavia; and here are built the barracks, the clubs, the hotels, and the best shops, dotted along roads shaded by leafy Hibiscus shrubs, or by the *Poinciana regia*, an imported Madagascar tree, which should be seen in the end of the year, when its broad spreading top is one mass of orange-red blossoms, whose falling petals redden the path, as if from the lurid glare of a fiery canopy above. To these pleasant avenues, in the cool of the evening, just after sunset, and before the dinner-hour, all classes, either driving or on foot resort for exercise and friendly intercourse.

In front of the barracks, another fine park, the Waterloo Plain, is ornamented by a tall column, surmounted by a rampant lion, with an inscription to commemorate the prowess of the Netherlanders in winning the battle of Waterloo. A remark, perhaps not quite fair, of a Ceylon friend on viewing the pillar and its long inscription: "The lion at the top is not more conspicuous than the lyin' at the bottom!"

Having been furnished, through the kind influence of Professor Suringar, of Leyden, with an autograph letter of recommendation from His Excellency the then Minister for the Colonies, to the Governor-General of the Netherlands' Indies, I proceeded, very shortly after my arrival, to Buitenzorg, for the purpose of presenting it. From His Excellency

I received most favourable letters of commendation to all in authority under his jurisdiction, and parted with the expression of his warm interest and best wishes.

Buitenzorg is one of the chief holiday and health resorts of sick Batavians, and possesses not only a magnificent climate, but scenery of great beauty and picturesqueness. It is overlooked by two large and at present harmless volcanic mountains, the Salak with its disrupted cone, into whose very heart one looks by the terrible cleft in its side, and the double-peaked Pangerango and Gede, from whose crater is ever lazily curling up white vapoury smoke from the simmering water which at present fills the summit of its pipe. Besides the fine views to be had in its neighbourhood, Buitenzorg is chiefly remarkable for its botanic garden, perhaps the finest in the world, which surrounds the Governor's palace, and in which many weeks might be profitably and delightfully spent by the botanist.

To Mr. Teysmann, who died but recently, after some sixty years of unbroken service in it, the garden is largely indebted for the actual ingathering of the bulk of its treasures. For fifty years he was engaged in collecting through the islands of the Archipelago; and some of the rarest and finest specimens in it, brought as seeds by him, he had the satisfaction of seeing develop into the grandest of its trees.

A long wide avenue of Kanarie (*Canarium commune*) trees traverses the centre of the garden, which interlacing high overhead in a superb leafy canopy, affords at all hours of the day a delightful promenade. Near the principal entrance a tall *Amherstia nobilis* forms in the rainy season, when it is ablaze with immense scarlet flower-trosses and plumes of young leaves of the richest brown, a remarkable object of beauty. On the right the garden descends to its boundary stream through arboreta of Buteas, Cassias, Calliandras, Tamarinds, and Poincianas, to groves of Bromeleads and tall *Cactaceæ*, Pandans, Nipas, Cycads and climbing Screw-pines; to plots of *Amaryllideæ*, Iris and water-loving plants; and beneath the richest palmetum in the world, its glory perhaps the *Cyrtostachys renda*, whose long bright scarlet leaf sheaths and flower-spathes, and its red fruit and deep yellow inflorescence hanging side by side, at once arrest the eye.

Bordering the stream is quite a little forest of oaks, laurels and figs, many of them yet unknown to science, merging in a long, dark, tunnel-like corridor of banyan trees. In a dense clump affixed to tall tree ferns and Cambodias, whose white, heavy-odoured flowers entirely carpeted the ground, were thousands of orchids from all countries, most of them blossoming as profusely as in their native habitat, except a few of the higher and cooler-living New World species, such as the Cattleyas, which gradually dwindle away and die out in a few years. More strangely, the native Phalœnopses (*amabilis* and *grandiflora*) refuse to thrive in the gardens, 750 feet above the sea, while in Batavia few plants flower so luxuriantly as they do.

On the left of the central walk there are two remarkable avenues; the one of stately Brazilian palms, the *Oreodoxa oleracea*, whose globular base and smooth ringed stems, were as straight and symmetrical as if turned in a lathe, and in their whiteness contrasted markedly with the deep green of the leaf sheaths and crown of foliage; the other of bamboos, remarkable for the number and luxuriance of its species. The curious root-growing Rafflesias, the *Amorphophallus titanum*, a giant arum, and the *Teysmannia altifrons*, a rare broad-leafed palm, from Sumatra, and others as rare, which would require too long a list to enumerate, were to be studied here. My daily morning round of the garden invariably terminated in a seat under an umbrageous india-rubber tree, in front of which a fountain played into a circular pond dotted with blue and white flowers of water-lilies and Victoria regias. In the sparkling light of the early sun it was the most charming of spots for a rest.

Ficus religiosa IN THE BOTANICAL GARDENS, BUITENZORG.

CHAPTER II.

SOJOURN IN THE COCOS-KEELING ISLANDS.

Start for the Cocos-Keeling Islands—In the Straits of Sunda—An unexpected pilot—Arrival—History of the colony there—Terrible cyclones—Home life of the colonists now—The reef and its builders—Fishes in the lagoon—Crabs and their operations—Plant life—Insect life—Mammals—Birds.

The end of the year 1878 was noted for its very heavy rains, which in the month of December were at their worst. Transport and travel were not only difficult, but in many districts impossible. Just as I was getting rather puzzled as to how to get away anywhere out of Batavia, I learned that a small sailing craft, on which I was offered a passage, was on the point of leaving for the Cocos-Keeling Islands. With this outlying spot, made famous by Mr. Darwin's visit in 1836, I was familar from his 'Coral Reefs.' It did not, therefore, take me long to decide to accept an offer which was as gratifying as it was unexpected.

After a wearisome fight of fourteen days with the Monsoon wind at the entrance of the Sunda Straits, we succeeded in reaching the little village of Anjer, where we stopped a day to replenish our failing stores of provisions, and to eat our New Year's feast in the picturesque inn there, whose verandah commanded a delightful view of the island-studded strait and of the rugged mountains of Sumatra on the other side. The wind, which had opposed us so persistently, had on the day we again set sail subsided altogether, and it was with the greatest difficulty that we could haul clear off the land. Day after day brought us a monotonous calm.

It was something, however, that at this season the forest along the slowly passing shores and isles was in the full burst of spring, when it wears in the morning light its most charming aspect, of surpassing beauty to my novitiate eyes; the piping

mid-day alone was ungrateful, almost unbearable, exposed to the sun, as we were, without awning or protection; the evening sunsets were scenes to be remembered for a lifetime. The tall cones of Sibissie and Krakatoa rose dark purple out of an unruffled golden sea, which stretched away to the south-west, where the sun went down; over the horizon grey fleecy clouds lay in banks and streaks, above them pale blue lanes of sky, alternating with orange bands, which higher up gave place to an expanse of red stretching round the whole heavens. Gradually as the sun retreated deeper and deeper, the sky became a marvellous golden curtain, in front of which the grey clouds coiled themselves into weird forms before dissolving into space, taking with them our last hope that they might contain a breeze, and leaving us at rest on the placid water, over which shoals of water-bugs (of the genus *Halobates* probably) glided, covering its surface with circles like gentle rain-drop rings; there was not a sound to break the silence save the plunge of a porpoise or the fluck of the fishes in quest of their evening meal. Perhaps these rich after-glows were due to the Kaba eruption then going on in Mid-Sumatra.

One day, we passed a large log in the sea floating in the current, to which numerous little crabs were clinging, on their way, perhaps, to colonise some new and distant shore.

On the afternoon of the sixteenth day of weary beating from Anjer, a pure white tern suddenly appeared, and, circling about the vessel, produced quite a flutter of excitement. It was the lovely *Gygis candida*, one of the Keeling Island birds, which our native boatswain declared never went far from home, and that we must, therefore, be near our destination.

Several of the sailors ran aloft, and in a few minutes descried to the northward the crowns of the higher cocoa-nut palms on the southern islands. We straightway changed our course; for our skipper had evidently miscalculated our noon position, and, but for this timely pilot, would have sailed past in the night. At sundown the islands appeared from the deck as a dark uneven line, rising little above the horizon; at ten o'clock we cautiously sailed in to the anchorage in the lagoon, lighted through by the phosphorescence from shoals of large fishes, which darted like rockets from below our keel.

The scene that met my eyes next morning was a curious

one: a calm lake-like sea enclosed by a palisade of palm trees on a narrow riband of land. My first feelings were those of surprise at the size of the atoll; for it was very much smaller than the mental picture I had formed of it from studying the Admiralty chart, and then of wonder that such a speck could hold its own against the relentless ocean, which seemed as if it might wash it away in any angry moment.

To form by personal observation more clear ideas of coral formation, and chiefly to note how the struggle between the reef-makers and the waves had been going during the past forty-three years, and perhaps the pride of saying I had lived on a reef, being the objects of my coming, no amount of dissimilarity from conceived ideas could disappoint me, or cause me to regret my visit; but I could not help thinking that it was a woe-begone spot to choose for a perpetual home, and a limited field to expend one's energies on.

Mr. G. C. Ross, the proprietor, shortly came on board, and with the most hearty greeting welcomed me; he rowed me ashore, and, without power of gainsay, installed me as guest in his comfortable home, for I was the first European who, not by compulsion of weather or other disaster, but really of set purpose, had during that period visited his island. We sat far into the night talking together, and I scarcely know which of us seemed most eager to learn. The rapid question and reply shot between us incessantly to the early hours, and as we sat and talked, it was with an *eerie* feeling that I felt the very foundations of the land thrill under my feet at every dull boom of the surf on the outward barrier—I conveying to my host's household all that was strangest and most interesting from the busy centres of civilisation, in politics (a far cry to them), in discovery and in invention, all that was newest from the outer and, to them, far-off world; he relating to me the thrilling domestic annals of his island domain.

Half a century had elapsed since his grandfather, descended of an old Scottish family wrecked in the troublous times of 1745, having brought an adventurous seafaring life to a close in command of one of the vessels stationed in the Java Sea, for the protection of British interests during our occupation of that island, had landed in December, 1825, and virtually taken possession of the group. His intention was to make

the spot a call port for the repair and provisioning of vessels voyaging between home and China, Australia, and India. Without then taking up residence, he proceeded to England, but returned in 1827 with his wife and family of six children, accompanied by twelve Englishmen, one Javanese, and one Portuguese. On landing he was surprised to find another Englishman, Mr. Alexander Hare, in possession of a third part of the group. This gentleman had held a government post in South Borneo during the English supremacy in the Sunda Islands; but having tried to assume the state of an independent ruler, which on the reinstalment of Dutch authority, he found himself unable to hold, he retired here with a large harem of various nationalities and numerous slaves, whom he treated with great harshness.

Mr. Ross, having brought out his English apprentices on an understanding that, as the whole atoll was his own, there would be, in the development of its resources, sufficient outlet for their energies, was much discouraged by the turn affairs had assumed. Hare exhibited a very unfriendly spirit towards the new-comers, so that, on Mr. Ross offering his people a release from their agreement, all, except three (a woman and two men), took the first opportunity of leaving in one of H.M. gunboats which touched at the islands. Ross managed, however, to increase his party by seven or eight persons from Java, and later on by additional Europeans, some of them his own relatives. With a large number of Sundanese coolies, hired in Batavia, he opened a trade in cocoanuts with the Mauritius, with Madras, and with Bencoolen and various other ports of the Archipelago.

Possessed of a considerable fortune, Hare lived for some time a lethargic life in mock regal style, in the midst of the constant discord and jealousies of his retinue, and in hostility to his neighbour. For the protection of what he considered an importantly situated island, and of his own rights, Ross solicited the authorities in the Mauritius to take the group under their protection—a responsibility they did not see it advisable to assume. Hare, on the other hand, covertly instigated the Dutch Government to claim possession, a suggestion which the Batavian officials entertained only so far as to send a gunboat to examine and report on the condition of the

islands. Direct application was then made by Ross to King William to proclaim the atoll English territory, but without success. Hare, after several years of a most worthless sort of existence, took his departure for Singapore, where it is said he shortly after died.

Mr. Darwin's visit took place not very long after Hare's departure, and just after the change of the settlement from South-Eastern to New Selima Island and his report as to the comfortable and flourishing state of the young colony at that time is not very favourable. It was always a subject of keen regret to Mr. Ross, that on Mr. Darwin's visit, in 1836, he was not at home. Mr. Leisk, who was in charge, showed Mr. Darwin over the place, and gave him a great deal of information, but though given in good faith, much of it was not quite accurate. After a few years of peaceful and undisturbed possession of the atoll, the whole of which Mr. Ross then laid claim to, it attained to a most prosperous condition; and its ships became well known throughout the Archipelago, Ross himself being styled the King of the Cocos Islands. Two villages were erected, one for the hired coolies, and the other, a little way distant, for the Europeans and those who threw in their lot with the new colony and were to share its fortunes—the true Cocos colonists. This state of prosperity was due mainly to the efforts of his eldest son—the father devoting the closing years of his life chiefly to study.* Their trade prospered and afforded a handsome annual balance for many years, and altogether life seems to have been very pleasant save for one element, the hired population.

The only coolies who could be got to engage to leave Java for a term of years, were criminals who had served their time in the chain-gangs of Batavia, and as they far outnumbered the Europeans and colonists, and were capable of any atrocity, they were a constant source of danger, and a heavy anxiety to those in charge. Every night a strongly armed patrol of true Cocos people had to mount guard from sunset to sunrise, and still continues to do so, with military regularity and rigour, the watches being struck, as on ship board, all through the night.

* By a curious mistake in the Royal Society's Catalogue of Scientific Papers, Mr. J. C. Ross's criticism of Mr. Darwin's 'Coral Reefs' is attributed to Sir J. C. Ross, the Arctic explorer.

From the amount of cocoa-nut husk, or coir, as well as from the combustible nature of all the buildings and of the palm trees themselves, incendiarism was the crime most feared at the hands of the lawless. Consequently it was sternly enforced that every individual should report himself at the guard-house at a fixed hour; and that every fire should be quenched at sunset. It was penal for anyone to spend the night on any but the Home island, without express permission from the captain of the guard. Every boat was numbered and had to be in its place an hour before sunset; if it were not, by tock of drum a muster was called, the absentees noted, and a search instantly instituted, to bring back the defaulters or to render aid in case of accident.

Unsullied as their history began, it was not long till a Black Calendar had to be added to their island archives. Criminals invariably betook themselves to the concealment of the forest-clad islets, where they could often elude capture for weeks; but, unless they could steal a provisioned boat, which was almost impossible, they could get no further. The tale of the restless dread and suspense which held the whole community, when some mutineer, with the desperate spirit of *amok* in him, was at large, and the exciting efforts to effect and to elude capture, was a chapter, which demanded little from the narrator's art, to engage my sympathies and my profound interest in this community, living its chequered life so far from the sympathies of the world.

To prevent any temptation to robbery no coined money is allowed on the atoll. The currency is in sheep-skin notes signed by Mr. Ross, which are good as between member and member of the community. Wages are paid in these or in goods and food articles brought regularly from Batavia, while the notes are exchangeable for Dutch money in Batavia on presentation to Mr. Ross's agent.

On the 31st March, 1857, as a large inscribed board near the landing place on Home island proclaims, Captain Fremantle in H.M.S. *Juno* visited the Cocos Islands, and, after the usual royal salute, declared them part of the British dominions, and Mr. Ross (the father of the present proprietor) their Governor during Her Majesty's pleasure. The whole was, it appears, a ludicrous mistake on the part of Captain

Fremantle, for the island intended to be annexed was one of the same name somewhere in the Andaman group! It is gratifying, however, to know that the islands are after all really British territory, for I myself carried down a copy of the Proclamation in the *Ceylon Gazette* of November 1878, by which the Cocos-Keeling Islands were annexed to the Government of Ceylon, "to prevent any foreign power stepping in and taking possession of them, for the purpose of settlement, or for a coaling station," as Russian agents, it was reported, had been examining the locality with sinister views.

The islands being of extreme salubrity, the true Keeling population, now mostly of mixed blood, had rapidly increased, and they enjoyed unbroken prosperity till 1862, when a cyclone in a few hours entirely wrecked their homes. The present proprietor, the third in succession, then a student of engineering in Glasgow, was hurriedly summoned to aid his father in the restoration of the islands, a task he was suddenly left alone to accomplish, when quite a young man, by the death of his parent. Abandoning all the more ambitious plans of his life, he gave himself up to the new position which he had been so unexpectedly called to fill, and with the warmest heartiness threw himself into all the interests of the islanders. He devised and has carried out liberal plans for their improvement, and for the advancement of those committed to his charge. Marrying a Cocos-born wife, who shared his ideas and interests, they became the parents of the people rather than their masters and rulers.

As rapidly as possible he rid himself of the chain-gang men, and being able, by a change in the laws at Batavia, to obtain coolies of the non-criminal class, he engaged only those of the best character. He cleared off the remaining forest and planted the ground with palms. Success attended his efforts. At length he brought into the Indian Ocean the new sounds of the puffing of steam mills, the whirring of lathes and saws, and the clang of the anvil. The general education of the children has been under a younger brother of Mr. Ross's, educated in a Scottish university. Every Cocos man has had, besides performing his ordinary duties of gathering nuts and preparing oil—which, exchanged in Batavia, returns as gain, or the food which they cannot produce within their own

bounds—to learn to work—and their proficiency astonished me—in brass, iron and wood. Every Cocos girl has had her term of apprenticeship to spend in Mrs. Ross's house in learning under her direction sewing, cooking, and every house-wifely duty as practised in European homes. I shall not soon forget the deft handmaiden—female servants were employed to do all the household work—who attended to my room; she was a tall Papuan, who had been rescued from slavery, now one of the true Cocos people, in whom all the grace of body and limb that she inherited from her race had developed, under the happy circumstances under which she had come, into the perfection of the human female figure. She could not have performed her work with more neatness and dexterity had she been trained at home. With all the respect of a servant, she mingled a kind solicitude in looking after my comfort and attending to my wants, which as a daughter of the island to its guest, she might without presumption use. A fresh rose was daily laid on my pillow and on the folded-down counterpane, while, that the water in my basin might seem fresher than its sparkling self, she sprinkled it with fragrant rose leaves.

No more flourishing or contented community could have been found at the opening of 1876, than its 500 island-born inhabitants. On the 25th of January, however, the mercurial barometer indicated some unusual atmospheric disturbance, and the air felt extremely heavy and oppressive. On the 28th it fell to close on 28 inches, a warning which gave time for all boats to be hauled to a place of safety, and other preparations for a storm to be made. On the afternoon of the same day, there appeared in the western sky an ominously dark bank of clouds, and at 4 P.M. a cyclone of unwonted fury burst over this part of the Indian Ocean. The storehouses and mills, but recently renewed, were completely gutted and demolished; every house in both villages was carried completely away. Among the palm-trees the wind seems to have played a frantic and capricious devil's dance. Pirouetting wildly round the atoll, in some places it had cleared lanes hundreds of yards in length, snapping off the trees close to the ground; in others, it had swooped down, without making an entrance or exit path, and borne bodily away large circular patches, leaving unharmed the encircling trees; here and there, sometimes in

the centre of dense clumps, selecting a single stem—a thick tree of thirty years' growth—it had danced with it one lightning revolution, and left it a permanent spiral screw perfectly turned, but otherwise uninjured.

About midnight of the 28th, when intense darkness would have prevailed but for the incessant blaze of lightning, whose accompanying thunder was drowned by the roar of the tempest, when every one was endeavouring to save what rice—the only provision spared to them—they could, Mr. Ross discovered to his horror, the bowsprit of a vessel which had been lying at anchor, riding on the top of a great wave straight for the wall behind which they sheltered. There was just time to make themselves fast before the water rushed over them, fortunately without carrying the ship through the wall; a second wave washed completely over the spot where Ross's house had stood, distant 150 yards from high-water mark. The storm attained its height about one o'clock on the morning of the 29th. At that hour nothing could resist the unsubstantial air, worked into a fury; no obstacle raised a foot or two above the ground could resist its violence. The inhabitants saved themselves only by lying in hollows of the ground. To what distance the barometer might have fallen, it is impossible to say, for the mercurial was carried away, and two aneroids gave in at 26½ inches.

The following morning broke bright and calm, as if the tempestuous riot of the night might have been an evil dream, only not a speck of green could be seen anywhere within the compass of the islands. Round the whole atoll the solid coral conglomerate floor was scooped under, broken up and thrown in vast fragments on the beach. On the eastern shore of Home Island, in particular just opposite the settlement, I observed a wall of many yards breadth, portions of it thrown up clear over the external high rim of the island, and several yards inwards among the cocoanut trees, all along the margin of the island. After six months, every tree and shrub was clothed in verdure; and before three years, they were in full bearing again.

About thirty-six hours after the cyclone the water on the eastern side of the lagoon was observed to be rising up from below of a dark colour. The origin of the spring, which

continued to ooze out for about ten to fourteen days, lay somewhere between the southern end of New Selima and the northern end of Gooseberry Island. The colour was of an inky hue, and its smell "like that of rotten eggs." From this point it spread south-westward as far as the deep baylet in South-east Island, where meeting the currents, flowing in at the westward and northern entrances, which run, the one round the western, the other round the eastern shore of the lagoon, its westward progress was stopped; whereupon, turning northwards through the middle of the lagoon (becoming slightly less dark as it proceeded), it debouched into the ocean by the northern channel. Within twenty-four hours, every fish, coral and mollusc, in the part impregnated with this discolouring substance—probably hydrosulphuric or carbonic acid—died. So great was the number of fish thrown on the beach, that it took three weeks of hard work to bury them in a vast trench dug in the sand.

At the time of my visit, the islands were slowly recovering from this sad disaster, and the whole settlement, living far from the busy strife of the world, yet sufficiently mingling with it to afford contentment without envy, seemed the ideal of a peaceful and happy colony. Mr. Ross, who is associated with several of his brothers, occupies a commodious and comfortable house midway between the two villages, surrounded by a high wall, enclosing a large garden in which fruit-trees and shrubs —sow manilla (*Mimusops*), bananas, loquat (*Eriobotrya*), Poincianas, and roses in grand profusion,—seem to flourish remarkably well, notwithstanding the scanty soil. Each Keeling family possesses its own neat plank house, comfortably furnished, enclosed in a little garden. Housed in a trim shed by the water's edge, each has one or more boats. These boats are their pride; and so ardently do they vie with each other in their speed, and in the elegance of their shape and furnishings, that the village possesses a fleet of really masterpieces of boat architecture. Living on the sea, as they do, they are all from their birth naturally skilful sailors; and one of the pleasantest reminiscences of my visit, is the sight of that little white-sailed fleet beating home across the lagoon, in a sunny evening, against a stiffish breeze.

It was exceedingly pleasant to observe the cordial and

affectionate relations existing between *The House* and the Cocos village. I noted little presents of first ripe fruit, or specially large eggs constantly being offered. When a death occurs—as one did during my visit—it is felt by each individual as if the departed had been of his own family. The interment takes place as soon as possible, and the usual vocations are resumed at once, every one trying, as best he may, to seem as if he had forgotten that they were one fewer. That in their relations one with another there should be perfection, is not to be expected, but a finer and more upright community I have never known; not a simpler or more guileless people—many of whom have never known, and never seen a world wider than their own atoll, which can be surveyed in a single glance of the eye; and I feel more than half confident that the English Service for the Dead has been said over, and that beneath the coral shingle of Grave Islet there rest, as blameless lives as perhaps our weak humanity can attain to.

The labourers' village is neatly kept, and though the coolies live under a stricter *régime*, they are treated liberally and kindly, and housed in comfortable dwellings. Their children are educated along with the Cocos children. Should a head of a family die, his children are, at the mother's option, sent back to their native place in Java, or if she elect, she and they may throw in their lot with, and after a certain probation become, Cocos people. Malay is the language spoken in both villages, though many of the Cocos people understand English.

As this was my first acquaintance with living coral formation, everything about me had the interest of novelty. My first morning's walk was to the seaward margin of the reef. As half a century is hardly a day's life in the existence of an atoll, Mr. Darwin's accurate description of that part of it might have been written the day before. The waves so continually break on the shore, that it is difficult, except on the very stillest days, to examine the coral on the furthest margin; yet I got every now and then, on the recoil of the waves, a good view of the shoals of *Scarus* feeding in the surf on the living coral. They are furnished on the front of their heads with soft pads, so as to be able to retain their position undisturbed among the breakers, by squeezing hard up against the uneven wall, while they are gnawing off the tips of the living polyps. During

my visit I had no very calm days; but in the still waters of the lagoon there was enough to occupy the busiest pair of eyes for weeks.

The wonderful display of colour seen in the placid water of a lagoon has been often described; but it can give to one, who has not himself visited a coral reef, but a very slight idea of the fairy bowers to be seen from over the side of a boat gliding gently across the surface of such a marine lake.

I carefully examined that part of the lagoon over which the poisoned water had spread, on a day when the water was so calm that I could see the minutest objects on the bottom. Its whole eastern half was one vast field of blackened and lifeless coral stems, and of the vacant and lustreless shells of giant clams and other Mollusca, paralysed and killed in all stages of expansion. Everywhere both shells and coral were deeply corroded, the coral especially being in many places worn down to the solid base. Since the catastrophe, there had been, till almost the date of my visit, no sign of life in that portion of the lagoon; I saw very few fishes, and only here and there a new branch of *Madrepora* and *Porites*. I found only one tridacna alive (its three years' growth being 12 inches in length, and 13 in breadth).

That an earthquake certainly occurred on this reef, as recorded by Mr. Darwin, two years before the visit of the *Beagle*, is an interesting fact. That an earthquake took place in 1876, cannot, I think, judging from the tidal wave, be doubted, although no tremor was detected by any one on the island—scarcely to be wondered at during the war of the elements. The wave, as well as the darkened water which issued, doubtless from a submarine rent, was almost certainly the result of volcanic disturbance in the close vicinity of the atoll. Mr. Darwin has described a dead field of coral observed by him, in the upper and south-east part, and has accounted for it by assuming, from information given him by Mr. Leisk, that S.E. island had been at one time divided into several islets by channels, whose closing up had prevented the water from rising so high in the lagoon as formerly; and that, therefore, the corals, which had attained their utmost possible limit of upward growth, must have been killed by occasional exposure to the sun.

I examined the chart made by Ross in 1825, ten years before Mr. Darwin's visit, but it exhibited no perceptible difference in the external configuration of the various islets. The soundings in the lagoon, however, showed a greater continuous depth at that time, and I am told that his vessel sailed, on her first coming, far up the bay, and anchored where now no ship can nearly approach. It is more probable that the explanation of this dead field lies in the supposition that a like phenomenon to that just narrated accompanied the earthquake of 1834. Beyond the boundary affected by the dark water, the coral was unharmed, and growing vigorously in thick bosses, (called "patches" by Mr. Darwin,) composed chiefly of *Madrepora* and *Pocillopora*, between which were basins of no great diameter, but reaching to a depth of some eight or ten fathoms, which were marvellous natural aquaria planted round with anemones, tesselated in blue and green designs with *Fungiæ* and brain-corals. But why no other species should grow in these deep clear pits, and why the various corals forming the bosses—which are chiefly of *Echinopora lamellosa*—do not stretch out their arms into and obliterate them, seems difficult to understand.

In the small boat channel close to the settlement, one of the few poisoned places in which the coral had begun to grow vigorously since 1876, I dislodged with my hand several living bunches from the chalky bottom on which they were growing. Their average diameter across the top was 12 inches, and their height from the centre to the tip of the branches $6\frac{1}{4}$ inches. This channel was thoroughly cleaned out down to the white mud on the 20th May, 1878, and as my measurements were made on the 30th January, 1879, the age of these bunches was under eight and a half months.

I could not help being struck by the number of brilliantly hued fishes in the deep pools of the lagoon. Banded and spotted Murœnoids (species of *Leiuranus* and *Opisurus*) glided about in snake-like fashion; in sea-weed or hydroid-covered crevices motionless *Antennarii* lay in wait, but it required a sharp eye to distinguish their quaintly adorned and mimicking bodies from the excrescences of their retreat. Other singular denizens of the lagoon are the Crayracions, which look like

round hedgehogs floating (as they do often) on the surface of the water; their jaws are armed with formidable solid teeth to enable them to feed on the coral; and the File-fishes, painted with cœrulean bands and harnessed with blue bridle-lines, which not only feed on the coral, but bore their way through the shells of Mollusca to extract the succulent morsels within. Their bodies terminate in a most convenient-looking tail, as if made purposely to handle them by, and I could not help feeling maliciously imposed on when I did so, by having very precipitately to drop a fine specimen I was lifting for examination, on the sharp hidden spines, with which that organ is set, running into my hand like a series of lances. One of the commonest genera of fishes in the tropical seas of the Atlantic, Australian and Indo-Pacific regions is the *Chætodon*, which is particularly attractive on account of the form and the singular brilliance of the coloration of its species. The heaps of fish that my boys, a couple of urchins not more than four years of age, used, by alternately harpooning and diving after them to bring in, formed when piled on the white background of the coral shore, a bright picture indeed from the wonderful variety of their colours—emerald-green, cobalt-blue, rich orange, and even scarlet.

Most of the lagoon fishes are good for food; but there is a species of *Scarus* which requires to be prepared for the table with very great care, for should the gall-bladder be ruptured, and its contents escape into the body-cavity, the flesh of the fish becomes quite poisoned. Several fatal cases had occurred in the settlement, especially among children, who almost immediately after partaking of the flesh were seized with giddiness and stupor, followed by death, with a dropsical state of the body, within two or three hours. The effect of the application of the bile externally produced simply a bad fester. A woman while cleaning such a fish by the shore, on one occasion threw out the entrails on the water, when a Frigate-bird (*Tachypetes minor*) which had been hovering over her, swooping down picked up the tempting morsel; but it had risen only some thirty feet in the air, when it fell back on the water lifeless. The sharks, the albacore (*Thynnus termo*) and the baracuta are the pirates of the lagoon, and the chief agents in restraining its over-population.

Among the branches of the ginger-coral, a great variety of Crustacea are to be seen creeping about, and in all the crevices Mollusca of every family, most conspicuous among them being the giant clams of the genus *Tridacna*, whose mantle edged with turquoise beads forms a beautiful object to look down on; but one must shudder for the diver who should accidentally thrust his head or a limb into its gape, which the slightest touch causes to close with a snap.

Nor was the interest of the atoll confined to its surf-beaten barrier and its teeming lagoon; every foot of the surface of the land, every atom of its substance, every stem of the vegetation that covered it, and each separate existence that crept or winged itself on and around it, by its very presence in this mid-ocean speck, was charged with a wondrous tale of strange vicissitudes and wanderings. By the inner margins of some of the islands (as will be seen on looking at the map), and forming lagoonlets in some of them, there are soft limy mud-flats, which are gradually becoming land, mainly by slow elevation and by crustacean agency.

One of the largest of these is in West Island. Its lagoon-ward portion, near the entrance conduit, which is submerged at high water, is tenanted by two, if not three, species of crab (*Gelasimus vocans*, *tetragonon*, and *annulipes*). They live in narrow corkscrew burrows, round the top of which there is always a little mound just such as is seen about an earth-worm's; and indeed they are most perfect worm substitutes. I counted one hundred and twenty of their holes in an area only two feet square; and as there were many square acres in the ground of which I speak, some idea of the number of this busy army may be obtained. They were incessantly active during the recess of the tide and even during high water, which is generally perfectly still, in carrying down twigs of trees or *fucus* leaves, scraps of cocoanut shell, and seeds, laying the foundation of the future land.

On placing the foot on the region occupied by them, one perceives an undulation of the surface followed, over a circular area, by a surprising change of the pure white ground into a warm pink colour, which for the moment the stranger puts down to some affection of his eyes from the reflection of the light. He soon perceives that this movement is caused by the simul-

taneous stampede of the dense crowd of the peopled shore into their dwellings, just within the door of which they halt, with the larger of their two pincer-claws, which is of a rich pink colour, effectually barring the entrance except where one watchful stalked eye is thrust out to take an inquiring look if the alarm is real. As one advances the pink areas again change into white, as the Crustaceans withdraw into their subterranean fastnesses. On traversing a broad field occupied by these crabs, the constant undulations and change of colours, produce a curious dazzling effect on the eyes.

The land between tide-marks is occupied by another turret-eyed vigilant pioneer of vegetable occupation against marine possession, which extends its operations further landward than the *Gelasimus*, and where the ground is more or less wet. This is a species of *Macrophthalmus* whose colour protects it from general observation till it starts to run. One-third of its time is spent under water, and two-thirds in energetic mining operations on land. It is to be seen constantly scattering around it, with a nervous jerk, the arm-fulls of sand which, held between its body and clawed foot, it has dragged up from below out of the burrows into which it carries all sorts of vegetable *débris*. On the slightest sound it scampers off to take refuge in the water, and is at once noticeable by its mobile stalked eyes curiously pricked up high over its body. These eye-stalks are conical cylinders set round, except on the narrow area along which they are applied to each other in the mid-line of the body, with facets which really form perfect little watch-towers commanding an unobstructed outlook to all points of the compass.

The area along the dry margin of the land is occupied by a third—a short-eyed—species of crab (*Ocypoda*), whose labours seem to tell more than those of the others. Besides burying smaller particles of vegetable *débris*, it lowers down large branches of trees, and even cocoa-nuts, by scooping away the soil below them, and carries down also the newly fallen seeds of the iron-wood tree (*Cordia*). Both these trees, which along with a rough sort of grass (*Lepturus repens*) and the hard-wooded *Pemphis acidula* lead the van of vegetable occupation of lands wrested from the sea, are in this way aided in their forward march. As soon, however, as its busy labours have

changed the white calcareous fore-shore into a dark vegetable mould, its occupation seems gone, and it retires in quest of new land to conquer.

Further landward the soil is tilled and turned up to the sun and rain by a species of *Gecarcinus*, which lives almost entirely in the dry land, visiting the sea only in times of great drought. A still more effective tiller is the great cocoa-nut crab (*Birgus latro*), one of the largest of shore Crustacea. It is chiefly nocturnal in its habits, and is not so often seen as the others. It makes in the ground deep tunnels, larger than rabbit burrows, lined for warmth (?) with cocoa-nut fibre. It has a habit of climbing the cocoa-nut palms, but whether to take the air or for temporary lodging is doubtful; it does not rob the trees, however, as has been charged against it, since it feeds only on fruits that have fallen. One of its pincer-claws is developed into an organ of extraordinary power, capable, when the creature is enraged, of breaking a cocoa-nut shell or a man's limb. The inner edges of the claw are armed with a series of white enamelled denticulations whose resemblance to teeth is singularly close, even to the irregular scarlet line below them which might pass for gums. The *Birgus* feeds on the nuts almost exclusively, using its great claw to denude the fruit of the husk surrounding it, and to get at the eye of the nut, which it has learned is the only easy gateway to the interior.

Of the three eye-spots seen at the end of a cocoa-nut only one permits an easy entrance. The *Birgus* does not waste its energies in denuding the whole nut, and it never denudes the wrong end. Having pierced the proper eye with one of its spindle ambulatory legs, it rotates the nut round it till the orifice is large enough to permit the insertion of its great claw to break up the shell and triturate its contents, whose particles it then carries to its mouth by means of its other and smaller cheliferous foot.

From this nutritious diet it accumulates beneath its tail a store of fat, which dissolves by heat into a rich yellow oil, of which a large specimen will often yield as much as two pints. Thickened in the sun, it forms an excellent substitute for butter in all its uses. I discovered it to be a valuable preserving lubricant for guns and steel instruments; and only when a small bottle of it, which I had had for two years, was

finished, did I fully realise what a precious anti-corrosive in these humid regions I had lost.

The *Birgus*, though belonging to a water-living family, spends the greater part of its time on the land, and Professor Semper* has discovered that, following on its change of habit, a portion of the gill-cavities of this singular crustacean have become modified into an organ for breathing air—"into a true lung," in fact.

Not less interesting than the marine, was the terrestrial life of these lonely isles. Mr. Darwin's famous visit was made about eleven years after their colonisation. More than half a century more had elapsed till I landed there. In 1836 Mr. Darwin gathered some twenty-two species of flowering plants. On comparing the list (at the end of this Part) of the plants collected or identified on the atoll by me with Professor Henslow's of those collected by Mr. Darwin, it will be observed that considerable additions have been made to its flora. It is not improbable, however, that a few of those not enumerated by Professor Henslow may have been overlooked by Darwin during the occupied days of the *Beagle's* short stay. Some are of more recent introduction, and are due with little doubt to the accidents of human inter-communication, while others have been intentionally introduced. Direct intercourse has principally been with Java, Mauritius, and India, and occasionally with Australia, by means of horse-laden vessels calling for water. The greater part of the indigenous vegetation consists, as Mr. Darwin has pointed out, of plants common to Australia and Timor; and it is certainly these we should most expect to find here, as the ocean currents which wash the shores of the atoll by running westward from Australian seas, and sweeping round north-eastward in the Indian Ocean towards Sumatra and Java, bring it nearer to Australia and the eastern part of the Archipelago than to its geographically closer neighbours. Thus by slow degrees and after many a failure have the ocean streams succeeded in clothing this lone speck with verdure.

When first occupied the islands were covered abundantly with iron-wood (*Cordia*) and *Pemphis acidula*, as well as cocoa palms. Accidental fires, however, both on North Keeling

* *Cf.* 'The Natural Conditions of Existence as they affect Animal Life,' by Karl Semper. International Series; p. 193. Kegan Paul & Co. 1881.

(fifteen miles distant) and on the south islands, destroyed nearly all the iron-wood forests, the most valuable timber the colonists possessed. This tree grows often with a most curious arching habit, and as the name they have given it indicates, its timber is very durable. I saw a trunk on one of the islets which after an exposure of over forty years was in every part perfectly sound; and a beam whose natural curve fitted without artificial bending the double arch of the ribs of a schooner of 200 tons building on the stocks of the island. The vegetation of the islands is now almost entirely cocoa-nut trees.

The history of this commonest member of its family might occupy a long and interesting chapter, if space permitted. Few, perhaps, know it better than Mr. Ross; and while enjoying the grateful shade and the delicious beverage that its fruits supply, I passed many a pleasant half hour in listening to his accounts of its growth and habits. As a rule it is a branchless palm, but on West Island he took me to see its rare occurrence as a branching tree, which, instead of fruiting spikes, invariably produced persistent branches crowned with a bunch of leaves—adding to the beauty of the already graceful palm.

Most nuts, as is well known, contain, on opening them, only one ovary cavity, but, as the three eye-spots indicate, all nuts ought to have, were they not naturally suppressed, three of these. Many of the Keeling palms produce not only their full complement of three compartments, but, what is more surprising, some have as many as eight and even fourteen. Such nuts produce palms with a common root, but with as many stems as they have cells. Under favourable conditions the cocoa-nut can produce its first fruit within four years from the fall of the seed nut from its parent tree, while it can go on for an unknown period throwing out every month a new fruit spike bearing from seven to fourteen nuts, which require from eight to thirteen months to ripen.

The palms in the *centre* of the islets grow to a greater height —some of them to 120 feet,—on account of the deeper soil and more abundant supply of fresh water, than those along the shores, but the oil-producing capacity of their fruit is not, however, greater. More oil is obtained from nuts which have formed during the early part, and ripened during the later months of the year. Mr. Ross assured me that during every

full moon, many of the fruits exposed fully to its rays are blighted, the pulp becoming puckered and shrunk. Sunstroke, he said, was also very common; but in this case the affected nut shrivels up, and when it is opened only a withered embryo is found inside.

I searched for the two trees seen, but not obtained by Mr. Darwin, as mentioned in his 'Voyage.' Of the one "of great height on West Island" I would have secured specimens but for an unfortunate discharge by a twig of Mr. Ross's gun, resulting in a severe and painful wound to his hand (happily not more serious than a bad flesh wound), which necessitated our return home, before we had succeeded. As it was the last occasion I could visit the islet, I was unable certainly to identify the tree, although from the seeds which I obtained, I have little doubt that it is a species of *Pisonia* (probably *P. inermis*) which is found in the Australian and Pacific islands. Its seeds are spiny and glutinous, and, by adhering in great numbers to their feathers, often prove fatal to the herons that nest in its summit. As many sea-fowl have almost a cosmopolitan distribution, it is easy to perceive how widely this tree might be disseminated by the birds that roost on it.

Mr. Darwin records that he took pains to collect every kind of insect he saw. Exclusive of spiders, which were numerous, thirteen species were found by him. A list of all those collected or seen by me would far outrun Mr. Darwin's, showing that by some means or other species are still finding their way to this distant spot. Unfortunately, this collection was destroyed on my way back to Java, and cannot be now named; but few, if any, of the species were referable to Australian, Timorese or East Archipelago forms, so that the origin of the fauna is evidently different from that of the flora of the atoll, and is doubtless due to many chance passengers, that half a century of the coming and going of ships has brought as stowaways and landed unknowingly; now an adhering cluster of eggs, now a gravid female, or perchance a mated couple. From the testimony of Mr. Ross, whom I have found a most accurate observer, the cyclones of 1863 and of 1876 added, if not new species, at least a host of new individuals to the Keeling fauna.

Among *Coleoptera* Mr. Darwin mentions only one small *Elater*; while I observed hosts of small *Melolonthidæ* (genus

Serica) and *Rutelidæ* (genus *Anomala*), whose presence, I am told, had been noted in abundance for only a few years previous to my visit. I saw them frequenting almost every open flower, towards which they were performing the kind fertilising office usually done by bees, whose place they seemed to take. Of *Orthoptera*, besides the ubiquitous cockroach (*Blatta orientalis*), there were a few *Acrididae*, and the common locust, which was found in increased numbers after the cyclone. The *Hemiptera* were represented by several species.

Of *Neuroptera*, white ants had spread their baneful hordes to most of the islands; while *Chrysopa innotata* and dragon-flies were very plentiful. Immediately after the cyclone the surface of the water was observed to be densely strewn with broken bodies of the latter, as if, in its course, the wind had encountered a cloud of them, and scattered their mangled remains as it travelled. I did not succeed in collecting any true *Hymenoptera*, but ants were abundant; a minute Fire-ant (*Camponotus*), the common Javan long-legged venomless species, and several black sorts had become domiciled on the islands. Every trading vessel in the tropics has its formicine fauna, and cannot help acting as a transporter of all sorts of ants from one region of it to another. *Lepidoptera* had perhaps increased more than any other family. The *Diopæa*, so common in Java among the sensitive Mimosa, and a minute Plume-moth sheltering among the red-wood (*Pemphis acidula*), and the *Scævola*, were perhaps the most common; the large Atlas-moth had become a settled resident here, as well as several moderately large diurnal species with a habit of pitching on the warm, bare ground and frequenting the *Guetarda* and the *Asclepias cuirassarica*. Among several sorts of flies, an *Asilus*, much like the large carnivorous fly common in South Europe, was most conspicuous.

The Mammalian fauna of the Keelings was an entirely introduced one. A herd of deer on Horsburgh Island, was interesting as being a cross between the Javan Rusa (*Cervus hippelaphus*) and the darker Sumatran species (*Cervus equinus*). Pigs ran semi-wild, and throve remarkably well on the broken scraps of cocoa-nuts everywhere lying about in the woods. Australian sheep, which fed on the *Portulaca oleracea*, on a species of grass, and on the tubers of an aroid which they scraped up, did not seem to suffer much from the novel maritime

conditions under which they found themselves. The settlers would be rendered supremely happy if such conditions would by any means prove prejudicial to the rats—the sole living creature unwelcome to their island home,—whose fecundity is becoming appalling, for every vessel that calls serves to infuse only fresh blood and vigour into the race.

Occasionally flying foxes (*Pteropus*) reach the atoll, but hitherto in too exhausted a state to survive. Once a pair arrived together; but both, unfortunately, soon died. It is not improbable that some day, through the favourable circumstance of an unusually strong and healthy pair shaping their course Keeling-wards, they may yet survive the arduous journey, and the atoll find them some morning added to its fauna. What has only just failed here, has doubtless succeeded in other oceanic islands, with different volant species.

Bird life was limited, but very interesting. Graceful Noddies (*Anous stolidus*) and Gannets (*Sula piscatrix*) were in thousands; and I had the satisfaction of watching what has been over and over described, but was new to me, how their industrious habits are taken advantage of by the swift-winged Frigate-birds. Hiding in the lee of the cocoa-nut trees, the *Tachypetes* would sally out on the successful fishers returning in the evening, and perpetrate a vigorous assault on them till they disgorged for their behoof at least a share of their supper, which they caught in mid-air as it fell. Such feelings of reprobation as I ought to have felt at their conduct was, I fear, not very deep; for the swoop after the falling spoil was so elegant an evolution, that, I confess, I always hoped that the poor Noddy would give up as heavy a morsel as possible, in order to necessitate a correspondingly eager dive after it. Refractory Gannets were often seized by the tail by the Frigate-birds, and treated to a shake that rarely failed of successful results. Fierce foes as they were in the air, on *terra firma* they roosted near each other like the best of friends. They breed only on North Keeling, and during that season the bare skin of the throat is of a very rich scarlet colour. They are powerful fliers, and can head against even a gale by taking in a reef in their long wings, so as to expose only the greater quills to its force.

The *Tachypetes minor* used to nest in the bushes of *Pemphis*

acidula on the South Keeling group; but since the settlement, constant interruption from the nut-gatherers has driven it to breed in North Keeling. When brought up from the nest in a state of semi-captivity, they can be trained to aid in the capture of their fellows, which are much used as food by the settlers.

A hunter wishing to shoot a few of these birds, throws out within gunshot on the surface of the water a piece of attractive bait, which the tame Frigate-bird swoops down, almost ostentatiously, time after time, to pick up. Several of its hungry brethren, always hanging about, soon make their appearance to struggle for a share; after two or three gyrations, the eager stranger swoops down for the tempting morsel, the decoy soars out of reach, while his unfortunate dupe falls a victim. If the others take flight, the same tactics will be followed again and again by the decoy, who exhibits no alarm at the report of the gun or the death throes of its companions.

The white, satin-feathered Tropic-bird (*Phaeton candidus*) was far from uncommon; but being a very high flier it was difficult to secure specimens of it. I was happy, nevertheless, to be able to examine in the flesh one, at least, of these beautiful creatures. It must possess wonderfully acute powers of sight, for when sailing along at a great elevation, I have seen it suddenly descend like an arrow, disappear below the surface of the sea, and in a few moments soar up with its prey in its mouth.

On West Island two species of Heron (*Herodias nigripes*, and *Demiegretta sacra*) nested on the high *Pisonia* trees, and, as I have said above, often died from the number of the glutinous seeds which clogged their feathers. The Australian Night-heron (*Nycticorax caledonicus*) builds on the same trees. This is the first record of its occurrence so far to the west, and ranging, as it does, from New Caledonia through the Moluccas and Timor, some ancestor of its own may, perchance, have carried out thence the seeds of the trees on which it now builds, just as its own young may be now distributing them to distant isles.

The most engaging of all the birds was our little pilot, the pure white Tern (*Gygis candida*) so chastely spoken of by Mr. Darwin. As the swallow is to us, such a pet is this bird to

the settlers. It chooses a strange place to set its nest in, if one may so speak of its brooding place. Its solitary egg is deposited on the leaf of a young cocoa-nut palm, at the time when the leaf has rotated from its vertical position to one nearly at right angles to the stem. The egg is laid in the narrow angular gape between two leaflets on the summit of the arch of the leaf, where it rests securely, without a scrap of nest, in what one would think the most unsafe position possible, yet defying the heaving and twisting of the leaves in the strongest winds. The leaf, as in all palms, goes on drooping further and further till it falls; and among the settlers it is a subject of keen betting, when they see a Tern sitting on an ominously withered leaf, whether the young bird will be hatched or not before the leaf falls. The result I am told has always been in favour of the bird; if the leaf fall in the afternoon, the Tern will have escaped from the egg in the morning.

Not infrequently the "Tjoo-Tjooit" lays its egg on a ledge in the work-sheds of the island, but it never builds a nest. The young one is fed incessantly by the parents with fishes, which are brought in mouthfuls of generally six at a time, arranged alternately head and tail. The old birds often feed on the Papaya fruit, hovering on their wings all the while like honeysuckers at a flower. This beautiful bird is to be found only on the lone islands of the great oceans.

Besides the little Philippine Rail (*Rallus philippensis*), a resident species often employed by the colonists to hatch out their domestic fowls, which they do with care, a species of Snipe and a Teal visit the islands every February and March in large numbers, where they find a grateful rest in that annual voyage—whence and whither I could not ascertain—that the changing seasons resistlessly impel them to. Jungle fowl, introduced from Java, were breeding and throve well; and lastly, I obtained some nests of the Yellow Weaver-bird (*Ploceus hypoxanthus*.) Strange to say, it also comes often across the sea (most probably from Java) to nest on this lone island. Mr. Ross informed me that it builds more frequently on North Keeling; neither parents nor brood, however, take up their residence, but wend their way back whence they came, leaving their elegant flask-shaped nests on the branches of the trees to intimate that they have come and gone.

INDIAN OCEAN

Map of the COCOS OR KEELING ISLANDS

exhibiting the changes that have taken place since 1836.

The outline and remarks printed in black is a reduction of the Admiralty chart published in 1866. The changes that have occurred, as delineated by Mr. Forbes, 1879, are marked in Red.

Area of poisoned water, Jany. 1876 . . . . .

Soundings in fathoms. those marked thus 30 indicate that no bottom was found at these depths.

HORSBURGH I.

PORT REFUGE

Direction I.

Workhouse I.

Prison I.

Pulo Jiggi I.

New Selima or Water I.

Malay Vil.

Landing Place

Boat Channel

Gooseberry I.

Flats partly dry at low water Studded with deep holes

Small Boat Channel

Boat Passage

Channel

Turk Reef

Uneven Coral with knobs

Coral patches growing up very rapidly and altering this part.

Deep pits between large blocks of coral

Flats dry at low water Studded with deep holes

Sand dry at low water

Turtle Isld.

West Cay

East Cay

Burial I.

Former Settlements

Very steep along the S. shore

Burton Point

ROSS OR WEST ISLAND

SELIMA OR FAIRIE OR SOUTH ISLAND

Soundings irregular on this side

Sand at low water

Spit of Coral & Sand Soundings said to extend nearly 5 miles to the S.S.W.

Soundings extend 3 miles to the East of the Island

Landing Place

Passage

Wreck Pt.

NORTH ISLAND

North Id.

SOUTH ISLAND

Village

Lagoon

Port

GENERAL MAP showing the relative position of the Islands.

Harper & Brothers New York.

CHAPTER III.

SOJOURN IN THE COCOS-KEELING ISLANDS—*continued.*

Coral reef formation—Observations on the elevation or subsidence of the Keeling atoll.

As the Keeling atoll was the reef most carefully examined and described by Mr. Darwin, and that with which, in propounding his famous theory of coral reefs, he has compared the others he describes, I felt specially pleased at being able to go over his own ground with his book in my hand, and gain a clearer understanding of several points which I had found it difficult to comprehend.

Unfortunately the weather during my visit was not sufficiently favourable to enable me to examine so closely as I could have desired the corals of the outer margins or to make the series of seaward soundings I had intended.

The first questions that present themselves to the traveller in midst of his amazement on first reaching that peculiar production of the warm seas—an island-speckled ring of coral holding its own against the waves—are, How came it into being here, Why of this singular form, and How does it continue to exist? Mr. Darwin was the first to attempt any far-reaching solution of these difficult questions, applicable to coral formations over all the world. As true reef-building corals, it is well known, can flourish only beneath a very limited depth—some twenty fathoms—of water, a great apparent difficulty existed "respecting the foundations on which these atolls are based, from the immensity of the spaces over which they are interspersed and the apparent necessity for believing that they are all supported on mountain summits, which, although rising very near to the surface of the sea, in no one instance emerge above it. To escape this latter most improbable admission, which implies the existence of submarine chains of mountains of almost the

same height, extending over areas of many thousand square miles, there is but one alternative; namely, *the prolonged subsidence of the foundations on which the atolls were primarily based, together with the upward growth of the reef-constructing corals.*" *

Since Mr. Darwin published this theory, several expeditions expressly directed towards the examination of the floor of the great oceans have taken place, prominent among them being the United States Exploring Expedition, the *Tuscarora*, the *Blake*, and our own *Challenger* voyages. These have put us in possession of a large body of facts scarcely guessed at when Mr. Darwin broke deep ground on this subject. Mr. Dana, Professor Semper, Professor Agassiz and Mr. Murray of the *Challenger* staff, have also specially made coral reefs a subject of study. These three last named investigators have shown that the explanation of coral reef formation may be in other causes than those of elevation and subsidence. Great submarine banks have been discovered, "covered by deposits of Pteropods and Globigerina ooze serving as foundations for barrier reefs and atolls, while their volcanic substratum has been completely hidden." "The fact that these great submarine banks of modern limestone lie in the very track of the great oceanic currents sufficiently shows that these currents hold the immense quantity of carbonate of lime needed in the growth of the banks. . . . Mr. Murray has shown that if the pelagic fauna and flora extend . . ., as experiments seem conclusively to prove, to a depth of 100 fathoms, we should have 16 tons of carbonate of lime for every square mile 100 fathoms deep. But the greater the depth at which these plateaux begin to form, the less rapid must be their formation. Deep water itself being, as Professor Ditmar has recently shown,† a greater solvent (not from, as has been held, its containing a much greater proportion of free carbonic acid, but because of its depth,) than shallower water, would dissolve up all the lighter and thinner calcareous shells and *débris;* while in less deep water, the dead siliceous and calcareous shells of Foraminifera, Sponges, Hydroids, Corals, Mollusca, etc., would accumulate and build up these plateaux," with a calcareous conglomerate. "Whenever

* 'The Structure and Distribution of Coral Reefs,' by Charles Darwin, 1842, pp. 146–7. The italics are the present author's.

† Official Report of the Scientific Results of the Voyage of H.M.S. *Challenger:* Physics and Chemistry. Vol. I.

such plateaux have reached, on their windward side, the level at which corals prosper, that is, some 120 feet below the surface, these coral reefs spring up and flourish,"* and subsisting at a greater depth than all others, a solid foundation is laid by the close compactly growing *Astrææ ;* then on their dense floor, in whose myriad crannies, molluscs and all manner of marine beings have sheltered, died and left their shells compacted by the carbonate of lime let loose from their partial disintegration and solution into a solid limestone conglomerate consisting of coral, of shells and of all that may have fallen on it, which they have raised layer above layer as near the surface as they may, the Brain-corals (*Meandrina*) and the *Porites* assume and continue the upward task till they " in their turn reach the limit beyond which they are forbidden by the laws of their nature to pass. . . . But the coral wall continues its steady progress; for here the lighter kinds set in—the Madrepores, the Millipores and a great variety of Sea-Ferns,—and the reef is crowned at last with a many-coloured shrubbery of low feathery growth." †

This is in its main outlines Murray's, Semper's, and Agassiz's explanation of how a reef originates. Unfortunately for my own satisfaction and guidance when examining the Keeling reef, I had not read Professor Semper's views, and those of the other two naturalists were not then published. I have now pictured the reef as risen to *almost* the surface of the sea at ebb spring-tides; higher than this the coral polyps, which die when exposed for a very short period only to the air and the sun, cannot raise it ; but as corals flourish best in the battle of the waves, which are better aërated and charged with the pelagic life which sustains them, they can extend only seaward and grow their fastest, checked solely where ocean currents scour too fiercely past them. In this stage such a coral structure (as the Keeling atoll) might be seen to be roughly circular in form,—observable also in all the raised islets of the group as well as in North Keeling,—doubtless by being beaten on all sides. Travelling from the exterior margin of the reef inwards, coral growth from less abundant sustenance is seen to be less

* 'The Tortuga and Florida Reefs,' by Alexander Agassiz, Mem. Am. Soc. of Arts and Sc., vol. xi. p. 113.

† 'Florida Reefs,' L. Agassiz, Mem. Mus. Comp. Zoology, p. 49. *Proc. R. S. Edinb.*, No. 107, 1880 : "On the Structure and Origin of Coral Reefs and Islands."

luxuriant and has grown to a less height than more externally, and consequently we have a *Lagoon*, which sometimes, though rarely, is enclosed by an unbroken ring of coral; more commonly, however, (as in Keeling atoll) the reef is intersected by several channels communicating between the lagoon and the outer ocean. These channels are produced by many causes, such as, swift currents interrupting the growth, decay of the coral from local causes, and natural or accidental disturbances.

On a subsiding or stationary foundation such a reef, raised to the level of low-water mark, can never by any luxuriance of its own growth rise above the water level and become a coral *island*. Great storms, however, by breaking off blocks of its living and ever seaward-growing margin, and throwing them on the lagoonward portion of the reef, alone are able to commence the raising above the surface of the ocean of future islets, on which after the gradual accumulation of soil, consisting of sand and the decaying flotsam and jetsam of the ocean, and the germinating seeds that the winds, the sea currents, or the birds of the air may chance to cast on its bosom, a green clothing of vegetation inevitably grows up.

In traversing the Keeling atoll it seemed to be unaccountable how the interior, or lagoon margins of the islets, which must necessarily have been thrown up above water at the earliest stage of the existence of the atoll, still continue (on the supposition that the atoll is subsiding) several feet elevated above high-water level, and show no indication of the water's encroachment. As a storm so violent as the cyclone of 1876 was capable of piling the torn-off blocks of the reef-floor—composed of a natural concrete of worn coral, shells, and the hard parts of pelagic animals, imbedded in a solid calcareous matrix—*only a few yards* over the higher edge of the island, it is impossible for the lagoon margins, in some places more than 800 yards distant from the sea, to be kept up in elevation by the debris of the outer margin; and the greatest storms do not affect perceptibly or permanently the shores of the lagoon.

Mr. Ross informed me that what Mr. Darwin, from the undermining of cocoa-nut trees seen by him, supposed to be sea encroachments, was intermittently taking place during

gales round the lagoon shores; and pointed out to me that where, in such places, a portion of the land was washed out, the same amount was replaced in some adjacent part of the shore. He showed me also on the little islet, named in the chart Workhouse Island, a rather exposed corner which had been completely washed away with all the trees on it, in the cyclone of 1876, but which in January, 1878, had become to a great extent replaced. A period going on for half a century had elapsed since Mr. Darwin's observations, and the encroachments of the sea on the land had, in my judgment at least, not increased at all; on the contrary, it struck me that the land was gaining on the lagoon. This, too, was Mr. Ross's opinion, from a thorough and intelligent knowledge of every part of its coast and surface.

On West Island, in a short time the lagoonlet will be entirely converted into dry land. At present it is nearly filled up, and remains dry at all ordinary tides except on two or three occasions a year, with a pure white chalk-like sediment, the detritus of coral-attrition by the waves washed in from the outside of the reef, where the sea is always more or less turbid; all along its coast also, as far as its south corner, the West Island is gaining ground by the accumulation of sediment. If subsidence were proceeding, this sediment could not rise above high-water level. In the centre of Horsburgh Island, which is three-quarters of a mile in breadth, the ground exhibits an unbroken solid conglomerate surface not composed of the strewn debris from storms; and a lakelet of salt water containing no life, which occurs in it, seems to be an old lagoon extremely shallow and nearly obliterated. In North Island also, 15 miles distant, as Mr. Ross told me, the lagoon was rapidly filling up; its entrance passage has since our knowledge of it been always barred by the reef. In all these islands, in sinking wells down for some 12—20 feet through the solid conglomerate of which all the islands are composed, fresh water can be found. The only exception is Direction Island, in which no fresh water has been discovered, and which is entirely composed, as far as borings have been made, of shingle debris such as is found along the beach of the seaward margin.

Between Direction Island and Workhouse Island I observed

what seemed to me signs of recent elevation. At ebb tide there the water was very shallow and quite warm to the hand, and I noticed *Ostræidæ*, small *Tridacnæ* and other shells all dead where they grew, doubtless killed by exposure to the sun at low tide and by the fresh water during heavy rains. Of these tropical downpours, Darwin records one as having taken place before his visit, and Mr. Ross told me that in 1866, there were several months of such continuous rain that the fresh water stood for several inches on the surface of the lagoon, causing the death of large numbers of fish, and no doubt of corals also.

Completely surrounding this little islet was a thrown-up beach of very white sand, quite different from that I saw anywhere else on the atoll, composed entirely of the minute shells of molluscs, Echini, and of crabs, with a small proportion of coral *débris*, probably raised by the waves from the seaward slope of the barrier, indicating, perhaps, a less abrupt descent than has been supposed. Since its first occupation (by Ross Primus) the lagoon has greatly filled up with coral patches and sediment, as he could sail his vessel much farther up towards South-east Island than now, and several boat channels cut as indicated on the map have become quite obliterated. On the east side of the atoll the islets are much smaller than at any other part, and this may result if such an untoward circumstance as the irruption of poisoned water, such as I have recorded above, were to occur at frequent intervals. It is possible also that such a stream might issue frequently, if not in great quantity, without being observed.

I incline to believe, therefore, that the Keeling reef foundation has arisen as Murray, Semper and Agassiz have suggested; but that its islets have been the result of the combined action of storms and the slow elevation of the volcanically upheaved ocean floor, on which the reef is built.*

The atoll offers to the marine biologist a rich mine that would take not a few years of working to exhaust;† to the

* An abstract of an exhaustive *resumé* and discussion by Dr. A. Geikie, F.R.S., of the Coral Reef theories will be found in *Nature*, Nov. 29 and Dec. 6, 1883, of which the full text has just been published in the *Proc. Phys. Soc. Edin.*, vol. viii. (1884).

† I have elsewhere (*Proc. R. G. S.*, March 1884) directed attention to the admirable situation of this spot for a Biological and Meteorological Station, where it could be kept up at the most trifling cost.

philosopher and student of human nature not a little to reflect on, as to the effect on the colonists of a life so isolated, so apart from the active stimulus of rivalry, and the sharp incentives to advancement born of public opinion and the intercourse of fresh minds, and so distant from the cheering influence of the warm sympathies of their fellow men; yet among whom, at least, instead of symptoms of physical, mental or moral degeneration—despite the belief of Mr. Dana * that, "notwithstanding all the products and all the attractions of a coral island, even in its best condition, it is but a miserable place for human development, physical, mental or moral,"—he would find continuous endeavour, industry and care crowned with progress, and lives spent in contented happiness; to myself it had opened a field of study charged in every aspect with all that was interesting and very much that was new.

On the 8th of February Mr. Ross brought me at last the inevitable news that the *Mabel* was again freighted with her cargo of nuts and oil, and would sail next day for Batavia, coupled, however, with a warm invitation to wait till her next return from Batavia, and visit in the meantime the North Keelings. Every consideration urged me to accept, but it was with liveliest regret that I found it impossible to do so. The recollection of its pleasures and its owner's Highland-chieftain-like hospitality (born of his blood) will ever make the Keeling atoll a memory to dwell on.

On the 9th we set sail, and falling in a few days later with the steadily blowing Monsoon wind we scudded gaily along before it, and anchored in Batavia on the 16th, accomplishing in a week what it had taken us thirty days to sail over on our outward voyage.

* Dana, 'Corals and Coral Islands,' p. 246.

APPENDIX TO PART I.

NOTE.—J., represents Java; T., Timor; T-L., Timor-laut; Sum., Sumatra; T. d'A., Tristan d'Acunha. The plants obtained by Mr. Darwin were described by Rev. J. S. Henslow in Ann. Nat. Hist., vol. i. p. 337.

I.—*List of the Keeling Atoll* PLANTS.

		Observed by Mr. Darwin.	Observed by The Author.
Anonaceæ.			
Anona reticulata, *L.*	.. ..	—	×
Cruciferæ.			
Sinapis juncea, *L.*	Aru...	—	×
Capparidaceæ.			
Gynandropsis, sp.	Prob. cultivated.	—	×
Malvaceæ.			
Hibiscus tiliaceus, *L.*	T., J., Pacf. Ids.	×	×
Hibiscus Rosa-sinensis, *L.*	Introduced.	—	×
Sida carpinifolia, *L. fil.*	Madeira. Mauritius. ..	—	×
Tiliaceæ.			
Triumfetta procumbens, *Forst.*	.. .. ..	×	×
Leguminosæ.			
Acacia farnesiana, *W.*	T.	×	×
Poinciana pulcherrima, *L.*	Introduced	—	×
Guilandina Bonduc, *Ait.*	T.	×	×
Rosaceæ.			
Eriobotrya, sp.	Cultivated.	—	×
Rosa centifolia, *L.*	Cultivated.	—	×
Myrtaceæ.			
Guava, spp.	Cultivated.	—	×
Lythraceæ.			
Pemphis aciduia, *Forst.*	T.	×	×
Papayaceæ.			
Carica papaya, *L.*	.. ..	—	×
Crassulaceæ.			
Bryophyllum calycinum, *Salisb.*	.. .. ..	—	×
Portulaceæ.			
Portulaca oleracea, *L.*	T.-L.	×	×
Rubiaceæ.			
Guettarda speciosa, *L.*	T.	×	×
Morinda citrifolia, *L.*	T.	—	×

	Compositæ.			
Sonchus oleraceus, *L.*	J., Sum., T. d'A.	—	×	
	Apocynaceæ.			
Vinca rosea, *L.*		—	×	
Ochrosia parviflora, *Hensl.*		×	×	
	Goodenovieæ.			
Scævola Koenigii, *Vahl.*	T.	×	×	
	Asclepiadiaceæ.			
Asclepias curassavica, *L.*	J.	—	×	
	Bignoniaceæ.			
Oroxylum indicum, *Vent.*	Cultivated.	—	×	
	Borragineæ.			
Cordia subcordata, *Lam.*	T., T-L., Austr.	×	×	
Tournefortia argentea, *L.*	T., W. Ind.	×	×	
	Solanaceæ.			
Physalis peruviana, *L.*		—	×	
	Acanthaceæ.			
Dicliptera Burmanni, *Nees, var.*	J., T.	×	×	
	Labiatæ.			
Leonurus sibiricus, *L.*		—	×	
	Verbenaceæ.			
Stachytarpheta indica, *L.*	Trop. Asia.	—	×	
	Nyctagineæ.			
Boerhavia diffusa, *W*, var. β, var. γ, *Hensl.*	T. ..	×	×	
Pisonia inermis (?), *Forst.*	Australia.	×	×	
	Amaranthaceæ.			
Achyranthes argentea, *Lam* , var. villosior.	T. ..	×	×	
	Urticaceæ.			
Urera Gaudichaudiana, *Hensl.*		×	×	
	Euphorbiaceæ.			
Ricinus communis, *L.*	Cultivated.	—	×	
Aleurites Moluccana, *W.*	(A. S. Keating.)			
	Gramineæ.			
Panicum sanguinale, *Lin.* var.	T.	×	×	
Stenotaphrum lepturoide, *Hensl.*		×	—	
Lepturus repens, *Forst.*	T.	×	×	
Eragrostis amabilis, *L.*	T.	—	×	
Fimbristylis glomeratus, *Nees.*		—	×	
	Palmaceæ.			
Cocos nucifera, *L.*, var. *Bali.*	(A. S. Keating.) ..	×	×	
	Pandanaceæ.			
Pandanus, sp.	(Holman.)	—	—	
	Musci.			
Hypnum rufescens, *Hook.*		×	—	
	Fungi.			
Polyporus luridus		×	—	

II.—*List of the* Birds *of the Keeling Islands.*

Ploceus hypoxanthus, migrant, nesting in North and South Keeling.
Padda orizivora, in captivity.
Gallus bangkiva, introduced.
Herodias nigripes, nesting on the Pisonia trees.
Demigretta sacra, nesting on the Pisonia trees.
Nycticorax caledonicus. Here found for the first time west of Timor.
Totanus canescens, migrant.
Scolopax rusticola, migrant.
Rallus philippensis; found in great abundance; brings up domestic chicks, when her own eggs have been changed for those of fowls or ducks.
Anas sp., migrant.
Anous stolidus.
Sula piscatrix.
Tachypetes minor.
Phaeton candidus.
Gygis candida.

III.—*List of* Corals *collected in the Keeling Islands. Determined by* S. O. Ridley, M.A., F.L.S., *and* J. J. Quelch, B.Sc.

Hydrocorallinæ.

Millepora verrucosa, *Mil.-Ed. & Haime.* Outside the reef.
forskäli, *Mil.-Ed. & Haime.* Inside the reef.

Madreporaria.

Madrepora scandens, *Klaz.*
orbipora, *Dana* var. Inside the reef.
Anacropora, *Ridley*, characterised as follows :—*

Anacropora.†

Madreporidæ of ramose habit. Axis and apex of branches formed by a spongy cœnenchyma. New calicles formed centripetally, *i.e.* from the base towards the apex; no calicle of any kind at the apex. Calicles equally distributed all round stem and branches, with a tendency to an arrangement in longitudinal series. Septal system well developed, comprising two cycles of six septa each, two (approximately upper and lower) primaries being larger than the four lateral primaries.

Obs.—Anacropora is based on the new species A. forbesi, described below, and on some forms which occur in the *Challenger* collection of reef-corals, to be hereafter described by Mr. J. J. Quelch, of the Natural-History Museum; I have had the advantage of Prof. Duncan's and Mr. Quelch's opinions on this important form, opinions which have been freely and kindly given. The general growth and other characters given above are essentially the same in all the species. In all the growth is low, the branches tending to form inosculations between each other; the stem and branches are cylindrical, and no distinct tubular calicles are formed.

From Madrepora this genus differs markedly in the centripetal production of the calicles, by which the youngest calicles are always the uppermost. From the subgenus Isopora, *Studer* (see *loc. inf. cit.*), it differs in the same point, as well as in its slender dendroid growth; but the first distinction is not so marked at first sight, since the peculiar growth of Isopora almost necessitates the absence of a *distinct* apical calicle, but (as

* Extracted from Ann. & Mag. Nat. Hist., April 1884, p. 285, pl. xi.

† From ἀν, privative particle, ἄκρος, summit, πόρος, passage or pore; in allusion to the absence of pores from the ends of the branches.

stated *loc. cit*) the mode of gemmation is centrifugal in Isopora, as in Madrepora, *s. str.* Other points distinguishing Anacropora from most species of Madrepora are the formation of the axis of the branches by a spongy cœnenchyma, whereas in many (if not all) Madreporæ this, in accordance with the centrifugal habit of budding, is occupied to a greater or less distance from the ends of the branches by the downward prolongations of the septa and the interseptal spaces of the apical calicle. The rudimentary condition of the external part of the calicle distinguishes Anacropora; for although it is commonly found (I refer to the sunk calicles occurring in so many species between the prolonged tubular or nariform ones) in *some*, it is never, so far as my knowledge extends, found in *all* the calicles in any Madrepora.

Although in its general appearance it differs remarkably from even the branched species of Montipora, yet the structural differences which separate Anacropora from this genus are very far less distinctive than those which separate it from Madrepora. In the first place, in spite of its external resemblance to Madrepora, it has the same system of calicular budding (*viz.* centripetal, from the distal cœnenchyma) which we find well developed in the ramose Montipora; the trabecular structure and the two-cycled arrangement of the septa is the same in both genera. On the other hand, whereas in Anacropora there is always an undifferentiated cœnenchymal apex, devoid of calicles, to the branches, in Montipora this apex appears always to bear at least one calicle on its surface. In Anacropora the calicles are always rather distant and tend to form lines, and are slightly raised above the surface, forming low hill-like eminences, whereas in the ramose Montipora (*e.g.* digitata, *Dana*, divaricata and superficialis, *Brüggemann*), which on the whole most closely approach Anacropora, the calicles open flush with the surface, are crowded indiscriminately, and no linear arrangement is apparent. In Montipora foliosa, it is true, the calicles, especially on the posterior aspect of the corallum, are elevated in a similar manner; but the foliate growth and the monticular *inter*-calicular eminences of the upper surface seem to remove this species far from the ramose Montiporæ. It seems to me not improbable that, for the reasons I have indicated, these ramose forms may have to be separated from the foliate and massive species of Montipora.

The relations of Anacropora may be thus shortly stated:—Anacropora has the general growth of Madrepora, but the manner of budding of Montipora.

The following is a description of the single species referable to this genus which I am able to describe; owing to the interest attaching to the type, I have allowed myself to give its characters at full length:—

Anacropora forbesi, *Ridley.*

Corallum branching frequently, dichotomously, occasionally subtrichotomously; branches given off in succession in a subspiral manner, the planes of successive bifurcations varying from about 30° to 100° with regard to each other; angle between branches composing bifurcation 80° to 100°. Stem and branches slightly curved, the apical branches more strongly so, cylindrical, except the terminal branches, which tend to curve outwards and taper gradually to points; diameter, main axes 6–7 millim., intermediate and terminal branches about 4 millim., greatest length between bifurcations of main branches about 30 millim., terminal twigs 25 millim. long. Calicles arranged more or less definitely, for the most part in series which follow approximately the longitudinal axis of the stem and branches, the calicles of one series alternating with those of the

adjacent series; series about 2 millim. apart, calicles about 2 to 2·5 millim. apart in the series. Calicles forming, everywhere but on the tips of the branches, low rounded elevations, by the gradual rising of the surface towards their inferior margins to a height of ·25 to ·7 millim., and occasionally by the similar but very slight elevation of their superior margins. Calicles orbicular, looking upwards; orifice of adult calicles ·5 to ·7 millim. in diameter; on the tips of the branches they open on the level of the surface of the corallum, are more or less imperfectly defined from the surrounding loose cœnenchyma, and measure about ·25 to ·4 millim. in diameter. Septa trabecular, consisting of vertical series of horizontal pointed projections from the wall of the calicle, beginning just below its margin, distinct. Primaries about ·25 millim. in length in full-grown calicles, comprising two main, opposite ones, variously placed (*i.e.* from parallel to the long axis to at an angle of 45° with the same), which converge towards the bottom of the calicle, where they meet and form a vertical plate; the other primaries are slightly smaller and do not meet below. Secondaries varying from about half the diameter of primaries to mere points on the side of the calicle; the secondary septum between the two lateral primaries is sometimes wanting.

—Corallum slightly vermiculate, always covered by minute points at surface (at apex looser, very porous); the outer one-quarter of diameter (except at apex, formed of a denser tissue, in which the calcareous trabeculæ exceed in diameter the spaces between them; the central one-half of the diameter (*viz.* usually about 2 millim.), consisting of a loose tissue, in which the calcareous bars are only about half the diameter of the intervening spaces; the meshes of this tissue (as seen in transverse section of a branch) elongate towards margin, smaller and relatively shorter at centre. Apices of branches, to a distance of from 2-8 millim. from the ends, formed of the looser axial cœnenchyma, and carrying more or less rudimentary calicles, which are at least 1 millim. from all other calicles in the same longitudinal series.

Hab. Keeling Islands, Indian Ocean; deeper water inside reef.

Represented by a single colony and a detached branch, which has lived independently after its fracture from the parent specimen.* They were collected and presented to the British Museum by Mr. H. O. Forbes, F.Z.S. &c., who has already (*Proc. Roy. Geogr. Soc.*, Dec. 1879) described these islands, and with whose name I have much pleasure in associating this new type. The chief colony measures 83 millim. ($3\frac{1}{3}$ inches) in height, 100 millim. (4 inches) in greatest breadth, and 55 millim. ($2\frac{1}{4}$ inches) from front to back; the detached branch, which bifurcates three times, was about 60 millim. long when alive. Parts of the corallum, owing either to an evanescent pigment or to traces of animal matter, have a most delicate pink tint.

Some interesting points are brought out by the detached branch; this occurs unrooted, but obviously had been broken off from the colony while yet alive, and lived subsequently free. As commonly happens in such cases, the fractured surface has healed over; but in this case the new material is not a continuation of the *superficial* cœnenchyma of the adjacent side over the stump, but the prolongation outwards of the loose central cœnenchyma which has developed on itself five or six young calicles. Here also the law of centripetal gemmation asserts itself, these calicles occurring on the sides of a central cone of loose cœnenchyma, of

* See Moseley's 'Notes by a naturalist on *Challenger*.' "Some specimens of this (*Porites*) species were unattached, though living, being in the form of rounded masses, entirely covered with living polyps . . . and I suppose from time to time rolled over by the waves": p. 344. [H. O. F.]

which the apex, 1 millim. long, is undifferentiated and bears no calicles. The same law is followed in the process of repair exhibited by a broken stump of a branch on the larger specimen. The wide angle of bifurcation of the branches causes the colony to assume a low decumbent form, and bringing, as it does, neighbouring branches into juxtaposition, gives rise to anastomoses; the branching in various planes gives it a broad top.

Echinopora lamellosa, *Esp.*
Montipora digitata, *Dana.* Inside the reef.
sp. near expansa, *Dana.*
Porites lævis, *Dana.* (?) Outside the reef.
Pavonia lata, *Dana.* Inside the reef.
Pocillopora brevicornis, *Lam.* Inside the reef.
elegans (?) *Dana.* Outside the reef.

PART II.

IN JAVA.

CHAPTER I.

SOJOURN AT GENTENG IN BANTAM.

On the road—The Sundanese language—Every man a naturalist—Bird-life at Genteng—Weaver-birds' nests—A native rural bazaar—Forest devastation—Geological structure of the district—A wonderful case of mimicry in a spider.

On my return to Java from the Keeling Islands, I had the good fortune to meet in Batavia with a countryman, Mr. Alexander Fraser, one of the few freeholders of land in Java, who though just starting for England, kindly offered me the privilege of collecting over his vast property situated in the western province of Bantam, and the hospitality of his house if I should choose to stay there. This offer I was only too pleased to accept, in order, while still within reach of civilisation, to become acquainted with, and gain some practical experience of, the necessities and modes of tropical life and camping, of which the novitiate traveller has such crude ideas—for collecting among tropical vegetation is very different from the ideas formed of it from like operations conducted amidst the sparse woods of our temperate climate;—but principally to isolate myself from all European-speaking people for the purpose of acquiring, with the aid of a few books and chiefly with my native servants, the Malay language as rapidly as possible. In addition, the late Dr. Scheffer, the kind Director of the Botanical Gardens in Buitenzorg, had recommended to me Bantam as a profitable and by no means, botanically at least, well investigated province to visit.

Having hired a couple of cahars—a sort of spring-cart with one horse, the general mode of conveyance when one travels as I was about to do, off the main roads,—one for myself and one for my baggage, I left Batavia at sunrise on the 12th of March, by the western road along the low northern shore lands towards

Rangkas-betong, by the famous highway which Dandels, one of the most energetic and far-seeing of all the early Governors-General of the Dutch Indies, constructed along the whole length of the island, and which has proved one of its greatest benefits and colonizers. To expedite the journeys of their various officials round their districts, at every five or six miles stable stations have been erected by the Government, where horses are changed, and which private travellers can obtain permission to make use of on payment of small mileage dues.

All along the road we passed little sign-posts with Arabic inscriptions indicating how many yards of the road on each side of them must be kept in repair by the various neighbouring villages. As the keeping of the roads is most strenuously enforced, they are never out of condition, and are a pleasure to drive over. Here and there it has been impossible to bridge the larger rivers in steep defiles where the stream is deep and swift, and these are crossed in large picturesque rafts which can accommodate horse and carriage and quite a little crowd of people at once. These rafts, by sliding on rattan rings along two strong cables of thick rattan canes securely fixed to both banks, are floated over by the ferrymen by hand-over-hand traction on these cables.

When on the road the dress of the Sundanese, especially of the women and children, is invariably bright coloured calicoes, clean and newly ironed, and their head-covering is the gaily lacquered bamboo hats for whose manufacture they are famous. The burdens of the men, whatever they may consist of, are made up in neat and tastefully arranged bundles, carried always on the shoulders, suspended at the ends of a bamboo—and it is amazing what a weight these thick-set stout fellows can carry in this way. Such a ferry, in the sunlight, with a background of green, wooded slopes, presents therefore always a gay scene and forms quite an interesting break in the drive.

The country throughout was rather tame, being quite stripped of forest, but full of interest, as the land, being entirely under rice cultivation, was laid out in the most beautiful system of terraces. The province of Bantam is densely populated, and scarcely a portion of uncultivated land was to be observed. As Mr. Wallace in his 'Malay Archipelago,' has fully described, this method, introduced by the Hindus on their

invasion of Java, has attained a wonderful development throughout the whole of the lowlands in the western part of the island. In these *sawahs*, as the natives call their wet rice fields, the grain is cultivated in small square borders separated by green, grass-ridged banks, kept constantly flooded with water brought by a wonderful network of channels in which an intricate system of sluices or valves distributes or cuts off its flow wherever desired. The entire face of such low hills as have a gentle slope, are thus laid out down to their bases, and at the season when the young corn is in its fresh green leaf the country is extremely pretty.

Mr. Fraser's estate-house at Tjikandi-Udik, which I reached late in the evening, I found to stand amid a rich and entirely cultivated country, but as regards my pursuits a barren territory. After enjoying for a few days the hospitality of the Administrator I moved south-westward to Genteng in the higher region of Lebak, where I was told some forest was then being felled.

Here I built a bamboo-hut in an open spot with an exhilarating look-out on the high mountains, and alone with my Malay boys began my initiation into the language of the country, and into the nomadic joyous life of a field naturalist. It is a life full of tiresome shifts, discomforts, and short commons; but these are completely forgotten, and the days seem never long enough amid that constant flash of delighted surprise that accompanies the beholding for the first time of beast or bird or thing unknown before, and the throb of pleasure experienced, as each new morsel of knowledge amalgamates with one's self.

Between myself and my boys for a time the most ludicrously comprehended sign-language was carried on, till their speech, whose sentences to my unaccustomed ears seemed composed of but one continuous word of innumerable uncouth syllables, began to shape itself into distinguishable elements, when to my amazement, as if some obstruction had been suddenly removed from my ears, I comprehended them as if I had been brought up among them. Before many weeks were over I could converse in the Malay tongue with an amount of freedom that surprised me.

The language of the district, that is, of the Sundanese them-

selves, though containing many Javanese and Malay words, is quite distinct from either. It is a coarser and rougher speech, and it was some time before I managed to acquire it; but I found it to be—like broad Scotch in comparison with pure English—one of great expressiveness.

As soon as I was able to follow their discourse with ease, my daily talks with these men were a source of great pleasure to me. I soon found out that in regard to every thing around them, they were marvellously observant and intelligent. Not one or two only, but every individual amongst them seemed equally stored with natural history information. There was not a single tree or plant or minute shrub, but they had a name for, and could tell the full history of; and not a note in the forest but they knew from what throat it proceeded. Every animal had a designation, not a mere meaningless designation, but a truly binomial appellation as fixed and distinctive as in our own system, differing only in the fact that their's was in their own and not in a foreign language. Often enough this designation has so close a resemblance and sound to Latin, that it has been accepted by Western naturalists as if it had been so. One of the liveliest and most obtrusive of the squirrels in Java and Sumatra is a little red-furred creature called by the natives *tupai*, and to distinguish it from its more arboreal congeners they add, from its habit of frequenting branches near the ground, the word *tana* (for earth); and *Tupaia tana* is its accepted scientific term among European naturalists.

They have unconsciously classified the various allied groups into large comprehensive genera, in a way that shows an accuracy of observation that is astonishing from this dull-looking race. In this respect they excel far and away the rural population of our own country, among whom without exaggeration scarcely one man in a hundred is able to name one tree from another, or describe the colour of its flower or fruit, far less to name a tree from a portion indiscriminately shown him. How acute is their observation is exemplified by their name for the groups of true parasitic plants of the *Loranthaceæ* (or Misletoes), which are disseminated chiefly by being unobtrusively dropped by birds in convenient clefts of trees, they denominate as *Tai booroong* ("birds' excreta"); while to epiphytic plants they give a name that has almost the signi-

ficance of our own scientific term. The great group of the Laurels, which so vary in flower and foliage as to be separated off into many genera by botanists, are all designated by the one name *Huru*, but they are differentiated by no fewer than sixty-three different specific terms, in every instance indicating some prominent distinguishing characteristic of flower, fruit or timber; and on examination, very few indeed of them turn out not to belong to the Laurel family. Of oaks, *Passang* in their tongue, they discriminate sixteen different species, commencing their list with the one they consider most typical, just as we find in our own catalogues of birds, among the Warblers for instance, *Cisticola cisticola* representing the typical species, the Sundanese say *Passang betūl*, or "true oak," for what they consider the oak of oaks. Among animals their system of classification into genera is not carried so far; but all the more distinctive groups, especially those living in communities, and every insect and bird, if in any way peculiar or where it can be mistaken for another, have each their own binomial appellation.

I was disappointed in finding that the forest about Genteng was nearly all second growth, with scarcely any of what I was principally in search of for my herbarium—specimens of the primal trees. Birds, however, were more plentiful, and in the avenue-like roads and paths, stretching for miles in the neighbourhood, butterflies and other insects were very abundant, but though interesting to me, and occasionally new to the ornithology or entomology of the Malayan region, most of them were species well known to science. Amid an expanse of low scrub in front of my door, on which the buffaloes from the neighbouring villages wandered more at their own will than directed by their young herds, stood within gunshot of my verandah table several tall trees, from which, frequented as they were at all hours of the day by different kinds of birds, I was constantly able to add with great ease to my collection, and to observe the habits of many species that it would have been difficult otherwise to see.

I never tired of watching the friendly relation between the Buffalo-birds (*Sturnopastor ialla* and *S. melanopterus*) and their bovine hosts. They used to collect in impatient flocks about the hour of the return of the herd to their feeding grounds from the wallowing holes, whither in the heat of the

day they retired; and as soon as the cattle arrived they would alight on their backs in crowds, to the evident satisfaction of the oxen, which they relieved of troublesome parasites. Although the herd-boys commonly lay dozing at full length on the buffaloes' backs, the birds seemed to know that they were quite safe, and would even alight on the bare backs of the sleepers, and from that hop on to the haunches of the quadruped; and when the herds were driven away at nightfall the Sturnopastors flew off to the forest.

One of the rarer birds obtained here was the fine red-crested Woodpecker (*Miglyptes tristis*), which much resembles the *M. gramminithorax* of Malherbe, which is not found in Java, while the former, distinguished by its uniform black breast and abdomen, is confined to this island.* In the gloaming, frequenting leafless branches, I often saw the minute Butterfly Hawk (*Microhierax fringillarius*), not so large as a shrike, darting after grasshoppers, moths and late-flying butterflies. Among the songsters that made themselves more noticeable by frequenting the isolated trees near my house, were the golden Oriole (*Oriolus maculatus*) and the yellow crowned Bulbul (*Trachycomus ochrocephalus*), which late in the evenings filled the whole neighbourhood with their melodious, clear, bell-like notes; while two members of the Cuckoo family, the "Doodoot" (*Rhinococcyx curvirostris*) and the "Bōot" (*R. javanensis*) used to utter their curious bleating call in the low jungle behind, often breaking with their weird modulations the stillness of the midnight. In a neighbouring clump of canes a colony of Yellow Weaver-birds (*Ploceus hypoxanthus*) had thickly hung their nests. Each nest was artfully suspended between the interlacing leaf-stems of one or two reeds in a most skilful way, to secure as much as possible the safety of their eggs during the waving of the reeds in the wind. These nests were not made fast to, but strung lightly on the leaves, sometimes passed through the fork of another leaf to form a pulley, so as to permit, by sliding along in the swaying of the grass, of their retaining their vertical position, which they must do, weighted as they are by a layer of clay in the bottom of the nests. I noticed that many of them were

* *Cf.* Hargitt, 'Ibis,' 1884, pp. 190, 191; and Nicholson, *op. cit.*, 1879, 16.

deserted from the breaking of one or more of their eggs, after incubation had progressed some way; in others, where there was only one chick, there was often one egg which had been cracked and become dried up, so that even with all their acute architectural devices the wind appears to wreck the hopes of the little builders.

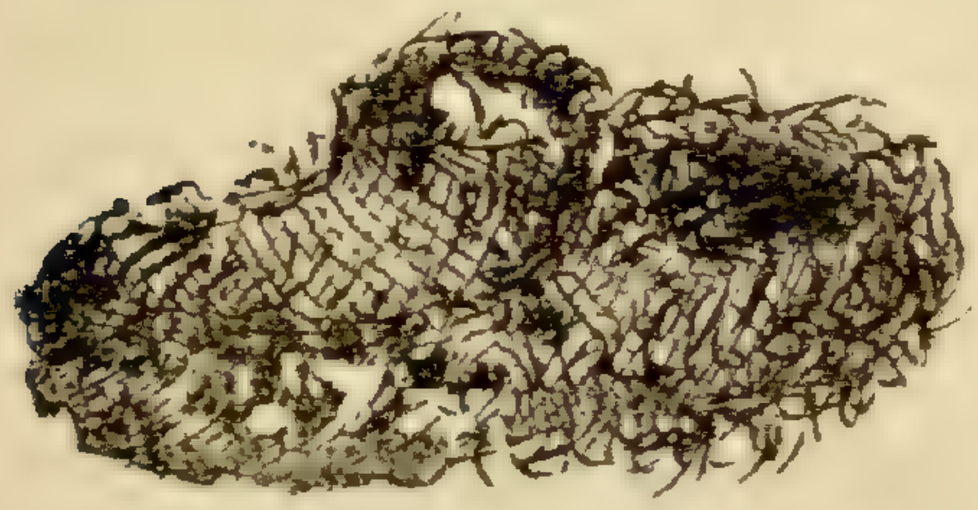
What can be the use of the mud in the Weaver-birds' nests has often been discussed. Mr. E. L. Layard, the accurate

TWO FORMS OF THE NEST OF THE WEAVER BIRD.

observer and well-known ornithologist, has suggested * "that these lumps of mud were used as scrapers on which to clean the birds' bills"; but if in the nests I found here they were used for this purpose, it must have been only at the commencement of their task, for the layer of mud would be quite concealed at an early stage of their nest-building. I am more inclined to the belief that they are to weight and balance the nest, from having found loose among the lower stems unfinished portions, which were evidently the foundations of

* *Nature*, Dec. 1879.

nests, which had been blown down before being properly secured, or were they, perhaps, abandoned unsuccessful first attempts? They had the exact shape of tiny key baskets, such as are used by housewives, one end being weighted with a layer of clay. I was also struck by the fact that different individuals had adopted different forms of nests, which, though agreeing fundamentally, exhibited considerable variation.



ABANDONED NEST-FOUNDATION.

The bulk of them were of the retort shape, set with a long-necked orifice hanging downward, but a considerable number, of the progressionist party perhaps, had inaugurated a new fashion by inverting the retort and shortening the neck, giving the doorway an upward and forward entrance, which, if more enticing to depredators, may perhaps be less awkward to the owners. I much regret that I have no note as to the position of the clay in this new form; for what was previously the bottom of the nest had become a dome over the bird, while its eggs were laid in what would correspond in the older pattern with the upper curve of the neck of the retort, so that if my belief is correct that the use of the clay is to retain the nest in its vertical position, it ought to be found occupying a corresponding site in the new structure. It is possible, however, that the deviation from the ancestral pattern may result from an unequal distribution of clay during the laying of the foundation of the nest, causing it to become reversed without diverting the bird's purpose from completing its work as best it could, under the altered conditions.

One of the bird-cries that early attract attention is the reiterated, unvaried call of the Bell-birds (*Megalæminæ*), poured forth in long stretches from the top of some high tree, where, from their plumage according so well with the varied colours of the vegetation, they can select a perch even in a prominent branch without fear of discovery. I obtained five different species of these birds, which belong to one of the most varied and beautiful-plumaged families, and of which some idea may be obtained by turning over the pages of Marshall's splendid monograph of the group.

A stream which ran near my house was crossed by one of those native-made bamboo bridges, which spaciously housed and thatched over, have such a neat and attractive look about them. Every Sunday morning the district market was held under it, which from an early hour presented quite a gay and busy scene. I never missed, if I could, an opportunity of visiting these *Passars*, as I found them delightful resorts for studying the native in his gayer moods; for market-day was always their holiday, and the market-place the rendezvous for the youths and maidens of the district, as well as the news-exchange of the old men. The vendors, to be early at the market-place, generally spent Saturday evening and night under the shade of the bridge, or collected in the neighbouring village, whence the tinkle of the gamelang, their characteristic musical instrument, would be heard throughout the livelong night in company, if not concord, with the higher notes of their curiously drawling voices, repeating tjeritas or semi-historical tales, and adaptations from the Korān, varied by *pantūns* or love songs.

The collection of wares exposed for barter was always a curious one: *sarongs* from their own looms—whose incessant click-clack is one of the most pleasant and characteristic of the industrial sounds in their villages—calicoes and silk kerchiefs from Manchester and Liverpool; Clark's Paisley thread of "extra quality"; native-made horn combs, gay ornaments of spangles and beads, and the elaborate inlaid silver breast-pins for which the district is famous, worn by every female to fasten her loose upper robes; and bamboo hats in great variety. The Bantamese are specially noted for the manufacture of these last, and some of them are really exquisite specimens of plaiting. In the finest quality, made of carefully prepared narrow strips of the wood, a quiet but lucrative trade is done with European markets by unobtrusive go-betweens who collect them through the district. In Bantam they cost a mere trifle, but in Paris, I am informed, they are retailed at a profit of nearly one thousand per cent., as true Panama hats, from which it is difficult to distinguish them. One of these hats, that I treated to the roughest jungle work of three years, was scarcely impaired when we parted company.

Other than these the chief articles were household utensils,

large copper jars for the preparation of rice, beat out of sheet copper by native smiths, and shallow iron basins (of Singapore make) for the daily extraction of the oil of the cocoa-nut palm, without which and its twin brother the bamboo, native prosperity and happiness would cease. There were besides piles of various species of dry-salted river fishes, chiefly Gabūs (*Ophiocephalus striatus*), Soro and Regìs (*Barbus duronensis* and *B. emarginatus*), and Guramè (*Ophromenus olfax*), the most prized of them all, in which a large and profitable trade is carried on with distant parts of the Archipelago. Many of these fishes are carefully preserved in the larger wet rice fields, where during the rainy season, having abundance of food, they multiply with great rapidity. During the hot season, when the *sawahs* have become, except in the centre, dry fields, the fishes are captured in immense numbers. Fried in fresh oil they form an excellent dish, and are the staple flesh-food of the natives.

A vile odour which permeates the whole air within a wide area of the market-place, is apt to be attributed to these piles of fish; but it really proceeds from another compound sold in round black balls, called *trassi*. My acquaintance with it was among my earliest experiences of house-keeping at Genteng. Having got up rather late one Sunday morning—an opportunity taken by one of my boys to go unknown to me to the market, which I had not then visited—I was discomfited by the terrific and unwonted odour of decomposition:—"My birds have begun to stink, confound it!" I exclaimed to myself. Hastily fetching down the box in which they were stored, I minutely examined and sniffed over every skin, giving myself in the process inflammation of the nostrils and eyes for a week after, from the amount of arsenical soap I inhaled; but all of them seemed in perfect condition. In the neighbouring jungle, though I diligently searched half the morning, I could find no dead carcase, and nothing in the "kitchen-midden," where somehow I seemed nearer the source; but at last in the kitchen itself I ran it to ground in a compact parcel done up in a banana leaf.

"What on the face of creation is this?" I said to the cook, touching it gingerly.

"Oh! master, that is trassi."

"Trassi? What is *trassi*, in the name of goodness!"

"Good for eating, master;—in stew."

"Have *I* been eating it?"

"Certainly, master; it is *most* excellent (*enak sekali*)."

"You born fool! Do you wish to poison me and to die yourself?"

"May I have a goitre (*daik gondok*), master, but it *is* excellent!" he asseverated, taking hold of the foreskin of his throat, by the same token that a countryman at home would swear, "*As sure's Death!*"

Notwithstanding these vehement assurances, I made it disappear in the depths of the jungle, to the horror of the boy, who looked wistfully after it, and would have fetched it back, had I not threatened him with the direst penalties if I discovered any such putridity in my house again. I had then to learn that in every dish, native or European, that I had eaten since my arrival in the East, this Extract of Decomposition was mixed as a spice, and it would have been difficult to convince myself that I would come by-and-bye knowingly to eat it daily without the slightest abhorrence. Dampier, who mentions it in his 'Voyage,' seems to have formed his acquaintance with it in a more philosophic spirit, for he describes it in these terms:—"As a composition of a strong savour, yet a very delightsom dish to the natives. To make it they throw a mixture of shrimps and small fish into a sort of weak pickle made with salt and water, and put into a tight earthen vessel. The pickle being thus weak, it keeps not the fish firm and hard, neither is it probably so designed, for the fish are never gutted. Therefore in a short time they turn all to a mash in the vessel; and when they have lain thus a good while so that the fish is reduced to pulp, they then draw off the liquor into fresh jars and preserve it for use. The masht fish that remains behind is called Trassi. 'Tis rank scented; yet the taste is not altogether unpleasant, but rather savoury after one is a little used to it."

One of the most terrible scourges of the island, and for which no remedy seems possible, is the spread everywhere of a species of tall, slender cane—useless for fodder and good only for thatch,—which the natives call alang-alang. Every spot unoccupied by forest, falls a prey to it; and when once it gets the upper

hand, forest seeds refuse to root in it. Neither the incessant rains, nor the driest droughts of summer kill it. The fire may sweep the surface bare, but it fails to touch the roots, which spring again in fresher vigour through the ashes. Deep shade alone seems to check its growth. The native in the hill regions does not make *sawahs* (which are good from year to year), but constantly takes in his fields by felling, where he lists, in the unbroken forest. As, after reaping for only two seasons this new land, (on which he scatters his seed between the fallen trunks), he deserts it for a newer patch, broad tracts of the island are every year becoming covered with this ineradicable exhauster of the soil, and by-and-bye the virgin forests of this country will have entirely ceased, if some sharper supervision be not exercised by the Government over the timber-felling mania of the native. As Colonel Beddome remarks of the like devastation in India: "the value of the timber thus destroyed by one man, calculating it by the number of logs it might have yielded, is at least twenty times as great as the value of the crop of *ragi* obtained in the two years that cultivation is continued. The low jungle which comes up after desertion of *kumari* land is more injurious to health than lofty forest open below. Besides health considerations and decrease of rain and moisture, this rude system of culture [results in] the destruction of valuable timber . . . . and rendering of land unfit for coffee."

The present vegetation of the whole of this portion of the island stands on an unbroken layer of volcanic mud, which tells of a period of almost unparalleled volcanic activity. Wherever the streams have opened sections, or a road cutting has been made, numbers of great trees, some of them thirty yards in length, are exposed in a completely silicified condition, and often so perfectly as to have preserved to their cores the structure of their tissues. Standing on some one of these bare denuding slopes, I have tried to picture to myself the terrible outburst in which this region must have been overwhelmed, at a date which cannot geologically have been very remote; for lying prostrate in great numbers as they were,—many of them having fallen across each other,—the forest of which they formed a part must have been suddenly entombed beneath an avalanche of the petrifying mud so deep that the powerfully

corroding tropical rains of centuries are only now beginning to exhume them.

About the only piece of exposed strata in this part of Java, I believe, lay within a few miles of my hut. Out of it I picked fossil fragments of vegetable stems, and of broken *Ostraa* and *Pecten* shells, closely resembling those still in the adjacent seas, and showing that an elevation of some 200 to 300 feet had taken place here at a recent period. That these subterranean forces whose activity resulted in the varied physical changes which West Java has experienced (such as the subsidence of the Sunda Straits), had not ceased, was brought home to me with all the vivid and indescribable sensations that accompany one's first experience of powerful and unwonted phenomena.

On the 28th of March, 1879, about eight o'clock in the evening, while sitting under my verandah, a sudden shiver and a violent bumping wave passed as it were through me and under my feet, bewildering me, but affording me the ineradicable experience of a violent earthquake. For some thirty seconds my hut and all its contents were lustily shaken, but otherwise no harm was done. Some forty miles away, however, at the base of the Gedé volcano, the village of Tjanjoor was wrecked and several lives lost amid the falling houses, while on the following day volumes of smoke and ashes were emitted by the mountain whose summit formed the background of my view.

One of my most interesting discoveries here was a case of mimicry in a spider, of the kind named alluring coloration by Mr. Wallace. The spider itself, to which I had given the provisional name of *Thomisus decipiens*, has proved interesting as the type of a new genus, named *Ornithoscatoïdes* by the Rev. O. P. Cambridge. The great interest attaching to this find, however, is on account of its habits. I had been allured into a vain chase after one of those large, stately flitting butterflies (*Hestia*) through a thicket of prickly *Pandanus horridus*, to the detriment of my apparel and the loss of my temper, when on the bush that obstructed my farther pursuit I observed one of the *Hesperiidæ* at rest on a leaf on a bird's dropping. I had often observed small Blues at rest on similar spots on the ground, and have often wondered what the members of such a refined and beautifully painted family as the *Lycænidæ* could find to enjoy at food seemingly so incongruous for

a butterfly. I approached with gentle steps but ready net to see if possible how the present species was engaged. It permitted me to get quite close and even to seize it between my fingers; to my surprise, however, part of the body remained behind, and in adhering as I thought to the excreta, it recalled to my mind an observation of Mr. Wallace's on certain Coleoptera falling a prey to their inexperience by boring in the bark of trees in whose exuding gum they became unwittingly entombed. I looked closely at, and finally touched with the tip of my

A BIRD'S EXCRETA-MIMICKING SPIDER.

finger, the excreta to find if it were glutinous. To my delighted astonishment I found that my eyes had been most perfectly deceived, and that the excreta was a most artfully coloured spider lying on its back, with its feet crossed over and closely adpressed to its body.

The appearance of the excreta rather recently left on a leaf by a bird or a lizard is well known. Its central and denser portion is of a pure white chalk-like colour, streaked here and there with black, and surrounded by a thin border of the dried-up more fluid part, which, as the leaf is rarely horizontal, often runs for a little way towards the margin. The spider, which belongs to a family, the *Thomisidæ*, possessing rather tubercu-

lated, thick, and prominent abdomened bodies, is of a general white colour; the underside, which is the one exposed, is pure chalk white, while the lower portions of its first and second pair of legs and a spot on the head and on the abdomen are jet black.

This species does not weave a web of the ordinary kind, but constructs on the surface of some prominent dark green leaf only an irregularly shaped film of the finest texture, drawn out towards the sloping margin of the leaf into a narrow streak, with a slightly thickened termination. The spider then takes its place on its back on the irregular patch I have described, holding itself in position by means of several strong spines on the upper sides of the thighs of its anterior pairs of legs thrust under the film, and crosses its legs over its thorax. Thus resting with its white abdomen and black legs as the central and dark portions of the excreta, surrounded by its thin web-film representing the marginal watery portion become dry, even to some of it trickling off and arrested in a thickened extremity such as an evaporated drop would leave, it waits with confidence for its prey—a living bait so artfully contrived as to deceive a pair of human eyes even intently examining it.

CHAPTER II.

SOJOURN AT KOSALA IN BANTAM.

Leave Genteng—Native blacksmiths at Sadjira—Hot springs of Tjipanas—Birds and plants at Tjipanas—Invitationto Kosala—The Kosala estate—The curious disease Lata—The Wau-wau—Birds—Bees—White ants—Great trees—Long drought and its consequences—The *Hemileia vastatrix*, a fungoid blight and the buffalo disease—Flora and Fauna of Kosala Mountains—Singular living ants' nests and their development—Orchids at Kosala and some curious devices for securing self-fertilisation—Ancient remains in the forest—The Karangs and their curious rites—The Badui—Religion and superstitions of the people of Bantam—Leave Kosala.

AFTER a very interesting period spent at Genteng, I removed further to the south in search of a station on the mountains, whose distant slopes I could see covered with the great forest which I had never yet beheld close, and under whose shade I had ever had such an intense longing to roam, the charm of whose grandeur, after spending unbroken years in it, remains still as one of the most delightful reminiscences of my residence in the tropics. Halting for a night at Sadjira I was taken by the chief of the village to see numerous blacksmiths at work in the manufacture of knives and krisses. The bellows used by them in order to give a continuous blast was made of two large cylinders of bamboo vertically set in the ground, in each of which a piston made of a dense bunch of feathers wound round a rod, was worked alternately, the wind being conducted through a small tube at the bottom of each bamboo, to meet in one pipe before passing below the fire.

Pandè is the Sundanese term for a worker in iron; the word is of Sanscrit origin, and originally meant "learned." Though this signification is not attached to it by the natives now, the smiths are held in the greatest esteem by them. Before the Hindu invasion the people of Java used only stone implements and hatchets, often of great elegance of design

and beautifully polished and turned. Dr. Solewijn Gelpke, the director of "the cultures" in Java, has formed at great cost a splendid collection of the implements of the stone age of the island, some of which I had the pleasure of examining on my way home in 1883. Of the beautiful workmanship of the early Javanese one or two fine specimens are to be seen in the ethnological collection in the British Museum.

In the village of Tjipanas, in the Tjiberang valley, distant only a few miles from Sadjira, I spent a week. The village derives its name from the *hot-springs* (which the name signifies) that issue from the ground there at a temperature of 137°–140° F. The place is permeated with the odour of sulphur rising from the springs, which had been dug out into cisterns, round which a crowd of sufferers from long distances were constantly seated, bathing their diseased and ulcerated limbs and rheumatic joints.

An abrupt hill which overshadowed the village, rising up to about 1000 feet above the sea, reminded me, in the way in which it was composed of great blocks of disrupted rock lying in all positions and at every angle one on another, of the titanic structure of the hills of Cintra to the north of Lisbon. Both probably owe their disintegrated condition to the constant earthquakes by which they are shaken. Growing on the thin soil on the tops of the rocks I gathered one of the most conspicuous of ground orchids, a tall white-flowered species of *Calanthe*, nearly all of whose flowers I was surprised to find had been shed without being fertilised; while in the crevices grew luxuriant Osmundas (*O. javanica*) closely resembling the Royal-ferns found at home.

In the young forest on its slopes I shot three interesting birds; a male and female of the *Platylophus galericulatus*, a crow-like bird with a handsome black crest resembling a cockatoo's, finally settling the question that Count Salvadori was correct in asserting its Sumatran ally (*P. coronatus*) to be a distinct species, and not the female of the Javan bird as was supposed by Mr. Elliott; the other the Fairy Blue-bird (*Irena turcosa*), one of the finest plumaged birds of the island, which is highly prized in Europe for plumassiers' purposes. Its wings, throat and breast are deep velvety black, while its head, back and tail are of glistening turquoise-blue, as if the colour

had been enamelled on in an unbroken sheet. It was found quite solitary or in company only with its mate, and never in flocks.

I was pleased to see the liveliness of the village children, who amused themselves with games very similar to those of children at our country schools at home—games of marbles played with small stones, very like what is called *keip* in the north of Scotland, with varieties of chevy, tig, and blind-man's buff.

Hearing that I had come to reside in the village, a countryman, Mr. H. Lash of the Kosala estate, sent me a warm invitation to make his house in the mountains my headquarters, which, as Tjipanas was a very unprofitable station, I was only too glad to do. Kosala was only a forenoon's ride up through winding valleys to an elevation of 1800 feet.

My gratitude can never be warmly enough expressed to this esteemed friend (now, I regret to say, no more) and his accomplished wife, for their great hospitality and kindness; and for the assistance which for many months was afforded me by my host, both personally and through his servants and horses, in making botanical collections in the large stretch of virgin forest which he owned, specimens of whose great trees were special desiderata with me.

Orchids abounded in great variety in the unopened forest, while the tree trunks that had been lying felled in the coffee gardens for some time were overrun with the species more delighting in sunshine. Being soon struck with the large number whose flowers fell without setting any fruit,—a fact that first struck me while botanising some years before in the south of Europe,—I determined to institute a series of observations on these plants, a project in which Mr. Lash—himself one of those who sedulously cultivate science in their leisure hours—entered with the greatest interest, and never wearied of personally searching for specimens, for whose rearing he put a great part of his beautiful garden ungrudgingly at my disposal.

The estate house, planned by himself, was a large tiled edifice of planks not subject to the attacks of insects, elevated a few feet on piles standing on an asphalt floor, isolated by a stream of water entirely encircling the building, so that it was

absolutely free from the tropical pest of ants. Perfectly constructed and furnished for a tropical climate, and provided with a large and valuable library, it was admirably situated for a botanical station—the hills rising round it to three thousand feet,—whose advantages the want of the necessary instruments alone prevented me from fully utilising. In no part of the world can the climate reach greater perfection, I think, than in the mountain regions of these islands, among which I first felt the real charm of the life I had espoused.

The first thing of interest to attract me, within a few hours of my arrival at Kosala, was a case in one of the servants of the house of that curious cerebral affection called by the natives *lata*. It is of a hysterical nature, and is confined chiefly to women, although I have also seen a man affected by it. On being startled or excited suddenly, the person becomes *lata*, losing the control of her will, and cannot refrain from imitating whatever she may hear or see done, and will keep calling out as long as the fit lasts the name—and generally that word alone—of whatever has flashed through her mind as the cause of it: "He-ih-heh, matjan!" (tiger); "He-ih-heh, boorung besar!" (a great bird). Her purpose will be arrested, as, if walking, she will stop short, and on going on again will often follow some other course. The prefatory exclamation is an invariable symptom, seemingly caused by involuntary hysterical inspirations. According to the degree of alarm the symptoms may remain only a few moments or last for the greater part of a day, especially if the patient be prevented from calming down. The afflicted, if not very seriously affected, are not altogether incapacitated from performing the duties to which they are accustomed. The most curious characteristic of the disease is their imitation of every action they see. On one occasion, while eating a banana, I suddenly met this servant with a piece of soap in her hand; and, perceiving she was slightly *lata*, but without appearing to take any notice of her, I made a vigorous bite at the fruit in passing her, an action she instantly repeated on the piece of soap. On another occasion, while she was looking on as I placed some plants in drying paper, not knowing that caterpillars were objects of supreme abhorrence to the natives, I flicked off in a humorous way on to her dress one that happened to be on a leaf; she was

instantly intensely *lata*, and, throwing off all her clothing, she made off like a chased deer along the mountain road, repeating the word for caterpillar as she ran, until compelled by exhaustion to stop, when the spasm gradually left her. My own "boy," who would unconcernedly seize all sorts of snakes in his hands, became one day *lata* also, on suddenly touching a large caterpillar. My host's maid once, while alone at some distance from the house, having come unexpectedly on a large lizard—the Baiawak—was seized by a paroxysm; dropping down on her hands and knees to imitate the reptile, she thus followed it through mud, water and mire to the tree in which it took refuge, where she was arrested and came to herself. Another case which came under my knowledge was more tragic in its results. This woman, startled by treading in a field on one of the most venomous snakes in Java, became so *lata* that she vibrated her finger in imitation of the tongue of the reptile in front of its head, till the irritated snake struck her; and the poor creature died within an hour.

During the attack the eyes have a slightly unnatural stare, but there is never a total loss of consciousness, and throughout the paroxysm the patient is wishful to get away from the object affecting her, yet is without the strength of will to escape or to cease acting in the way I have described. *Lata* persons are constantly teased by their fellows, and are often kept in an excited state for whole days.

In the early mornings here, I was at first constantly awakened by the loud plaintive wailings of a colony of Wau-waus, one of the Gibbons (*Hyalobates leuciscus*) from the neighbouring forest, as they came down to the stream to drink. On first hearing their cried one can scarcely believe that they do not proceed from a band of uproarious and shouting children. Their "Woo-oo-ŭt——woo-ut——woo-oo-ŭt——wut-wut-wut——wutwut-wut," always more wailing on a dull, heavy morning previous to rain, was just such as one might expect from the sorrowful countenance that is characteristic of this group of the Quadrumana. They have a wonderfully human look in their eyes; and it was with great distress that I witnessed the death of the only one I ever shot. Falling on its back with a thud on the ground, it raised itself on its elbows, passed its long taper fingers over the wound, gave a woful look at them, and fell

back at full length dead—"saperti orang" (just like a man), as my boy remarked. A live specimen brought to me by a native, I kept in captivity for a short time, and it became one of the most gentle and engaging creatures possible; but when the calling of its free mates reached its prison-house, it used to place its ear close to the bars of its cage and listen with such intense and eager wistfulness that I could not bear to confine it longer, and had it set free on the margin of its old forest home. Strange to say, its former companions, perceiving perhaps the odour of captivity about it, seemed to distrust its respectability, and refused to allow it to mingle with them. I hope that amid the free woods this taint was soon lost, and that it recovered its pristine happiness. The habits of the Wau-wau closely resemble those of the Siamang of Sumatra.

Large stretches of the forest in the immediate neighbourhood of the house were planted in coffee gardens, cultivated not as in Ceylon in the open sun, but under moderate shade chiefly of the *Erythrina indica*, in patches cleared out of the forest some distance isolated from each other so as to prevent the spread, if possible, of any outbreak of the coffee disease (*Hemileia*), and to give each garden a chance of escape. Seen from the heights above, these parterres scarlet with erythrina flowers, had a very brilliant effect on the landscape. In the newer gardens many of the felled trees still lay rotting, and there insects and birds were in abundance; but Java has been so well collected over by excellent entomologists and naturalists for so long a period that few novelties could be expected. Nevertheless, in all departments, species of interest were constantly falling under my notice for the first time.

I used to place a lamp close to my open window, in hope of attracting moths; but, while very unsuccessful in this respect, I had frequent visits from the smaller sorts of bats, which, on my slamming the window to, were, though safely trapped, not ensnared within the folds of my butterfly net without a deal of clever dodging on their part, and of noisy disturbance of furniture on mine. Of these one was a very rare species, *Calops frithii*, and another has been described as new to science by Mr. Oldfield Thomas, under the name of *Kerivoula javana*, a form intermediate between the Philippine and New Guinean types.

For many months after my arrival the earliest hours of the

morning were always resonant with the rich deep notes of the Tjiung or Béo, as the Javanese Grackle (*Gracula javenensis*) is named. They used to frequent a papaya-tree which grew just outside my window, whose fruit they are extremely fond of, whence they poured forth their song in the intervals of feeding. This bird, which is of a rich metallic blue-black plumage, has the nape of the neck adorned with two deep orange lappets, and is greatly prized as a pet by the natives, from its deep and ventriloquistic voice, its wonderful aptitude in learning to speak and whistle, and for its comical ways. A very high price is often given for a well-trained bird, even by the natives. The Grackle is somewhat difficult to rear at first, but when once accustomed to confinement it thrives well—I have seen one which had been caged for nearly eighteen years—especially if a bamboo cylinder be placed in the cage for it to creep into at night, as, when in freedom, it does into a hole in a tree.

Pink-headed doves (*Ptilopus porphyreus*) fed in flocks on the figs; and at 3000 feet I stumbled on a nestful of six fledglings of *Pomatorhinus montanus*, which were being tended, I was surprised to observe, by three parents; but I was unable to satisfy myself positively whether the additional parent was male or female; my boy, however, who on most subjects was well informed, said that "the female 'Patjingpayor' has always two husbands."

No insect sooner attracts the observation of the new comer than the destructive carpenter bees, *Xylocopa*, which with noisy ostentation are incessantly boring their wide tunnels into the woodwork of every building. To sit watching their entrance, and clay each up in a living tomb of its own digging, was one of the most hilarious amusements of the boys. Many other species of *Hymenoptera* attract attention by their curious persistence in building mud-cells from every hanging thread, in locks and hollow tubes, and in every unoccupied corner, stocking them with the caterpillars and spiders which is all the store their parental feelings induce them to lay up for the benefit of their progeny. In the forest the resemblance of their domiciles to their surroundings makes them less easy to discover; but the accompanying figure of a nest of one of the *Eumenidæ* (*Zethus cyanopterus*) shows how artistic and ingenious some of these creatures are.

A colony of these bees had covered the stems of a species of *Asclepias*, overgrowing the face of a high cliff; and it took a sharp eye to distinguish their nests from clusters of the withered leaves of the climber. Composed of chips of leaves glued together, they were protected from the rain by a projecting roof, which for the purpose of concealment was cunningly shaped like the foliage of the plant itself. There

NEST OF THE ZETHUS CYANOPTERUS.

was quite a crowd of them, and as they circled about, their dark wings flashing in the sun as they darted out and into their nests, they reminded me of swallows about a church window.

Less obtrusive, more destructive, but full of interest, are the operations of the various colonies of termites or White-ants. It is impossible to observe the habits of those that bore in the

interior of planks and trees; but by the species, that build large excrescences on the tree-trunks, one must admire the specially happy way in which has been settled the difficult question of how to keep their thoroughfares clean and unobstructed, and with the least trouble dispose of the refuse of so large a colony. It is worth while to break down a portion of their tough walls, to watch for half an hour the outrush of the city guards with their *pikelhaube* heads, who with elevated antennæ sniff round everywhere for the cause of alarm, charging about frantically, nodding and beating their spiked frontlets against the walls in a most threatening way, till they think the danger past, when they retire and order out hordes of builders to repair the breaches, who, distinguished at once by the absence of a frontal spike, have till then kept away from the scene.

After a general survey of the ruins, each worker retires to fetch a small squarish chip, carefully examines the exact place into which it is to be built, then applying to that spot the tip of its abdomen, it excretes a drop of a pale glutinous substance, places in it the chip, and hammers it down by the combined application of its maxillæ and antennæ. While the building is going on a company of soldiers stalk about the walls guarding the workers, every now and then tapping their heads with the conscious air of a constable reminding them that his presence is their safety. Thus block after block with amazing rapidity is cemented together, and the sewage of the colony is piled into the odourless homogeneous walls of their dwelling.

I was astonished one day in making a sweep through a swarm, as I thought of bees, which was buzzing overhead, to find that it was composed of flies called by the natives *Papantong*, a species nearly related to our common Blue-bottle.

Above the coffee gardens the heights, up to 4000 feet, were clothed with virgin forest, full of noble giants of the woods. In the gardens many of the finest of these trees had been allowed to stand, where they exhibited all the stateliness and grandeur of stem and crown which can be fully appreciated only when surveyed at some distance off. Prominent for their straight and shapely pillar-like stems stand out the Lakka (*Myristica iners*), the Rasamala (*Liquidambar altingiana*), and the white-stemmed Kajeput trees (*Melaleuca leucadendron*), all of them rising with imposing columns, without a branch often

for 80 and sometimes 100 feet. Of the other stately trees here, I noticed the Mangosteen (*Garcinia mangostana*) and the *Vernonia javanica*, a member of a family, the *Compositæ*, that in our own country never attains any importance greater than that of a moderate herb.

The season, however, was a very unfortunate one for enlarging my herbarium. Little over ten per cent, of all the forest trees in 1879 produced either flower or fruit. During 1877 a great scarcity of rain prevailed, while in 1878 almost an unbroken drought existed during the East-monsoon. The parched surface of the ground broke up into ravine-like cracks, which, extending from four to five feet in depth and two to three in breadth, destroyed great numbers of the forest-trees by encircling and snapping off their roots. Shrubs and small trees in exposed places were simply burned up in broad patches. Flowering was almost entirely suspended—so much so that the wild bees could produce no honey, which in ordinary years is one of the very abundant products of the forests. Crops of all kinds failed, while devastating fires, whose origin could seldom be traced, were so frequent in the forest and in the great alang-alang fields, that the population lived in constant fear of their villages and even of their lives and stock. It was in vain that the natives, following their superstitious rites, carried their cats in procession, to the sound of gongs and the clattering of rice blocks, to the nearest streams to bathe and sprinkle them; the rain after such a ceremony *ought* to have come, but it did *not*.

The *Batavia Handelsblad* states the loss in Java, consequent on the drought of 1878, to have been on coffee, ten millions of guilders; on sugar, seven; on tobacco, five; and on rice fifteen—equal in all to a loss in English money of £3,000,000. The West-monsoon (November to March) of 1878–9, memorable for its excessive rain, was followed by an abnormally wet and sunless dry season, which was almost as disastrous for the cultures of the island as its predecessors had been from drought. The coffee-trees produced abundance of flowers, but as scarcely a bee was to be seen anywhere, very few of these became fertilised or produced berries—so easily is the balance of nature disturbed. Later in the season, however, the coffee shrubs produced a second show of flowers, which in a multitude

of cases did not proceed further than knobbed buds, the bulk of which I found, by marking and carefully examining them every day, produced fruit without expanding their petals, or, to use the scientific term, cleistogamously.

Marching in company with these disastrous seasons came the terrible epidemic among the buffaloes (the natives' stay in the cultivation of their fields, and the main part of their riches), which had not disappeared in the middle of 1883, being less violent only from paucity of victims. The plague was nearly coincident with the blight—fortunately not of a very severe nature—of the *Hemileia vastatrix* in the coffee gardens. It is a remarkable fact that the buffalo disease and the *Hemileia* appeared without, as far as can be traced, extraneous contagion, on the western coasts of Sumatra (happily for that island in a slight degree only), and on the extreme west of Java, whence it vaulted in most eccentric riot throughout the whole island. Not only was the coffee blighted, but the grass meadows and the forest trees also were so covered, especially in places with a westerly exposure, with a fungoid disease as to become a subject of native remark. One could not help suspecting that these noxious germs had been brought by the winds, and that perhaps even the plague in the herds had resulted from the blighted grass on which they fed. The correctness of this view seems to some slight degree corroborated by the information I subsequently obtained from natives and others in various parts of the Archipelago. In Sumatra, not only the buffaloes suffered, but the elephants, the deer and the wild pigs died in the forest in immense numbers, and, by preying on the dying herds, even the tigers fell victims to the stalking pestilence. In Timor also, in the higher parts of the interior of the island, the cattle were attacked, while in the southern plains the pigs and the horses, which there run wild in herds, were found scattered about in the forest dead.

Closely following the bad years and the bovine pestilence, which deprived them of the means of cultivating their lands, came a scarcity bordering on famine and a fever epidemic of a virulent kind, to which the natives succumbed in thousands. The tale of the woes of their province must surely have seemed to them full and running over when the volcanic wave

from the eruption of Krakatoa, in 1883, overwhelmed its seaboard and washed so many of their fellows to destruction.

Notwithstanding the bad season, by hunting far and wide my herbarium grew slowly in bulk, for, though the great trees were in a very destitute condition, herbaceous plants were abundant, and not a few of the smaller shrubs and trees had begun to recover somewhat. Among the most attractive shrubs were the species of figs, of which there was an endless variety. The whole group of the *Artocarpeæ* is remarkable for beauty of foliage and fruit—as the hollow receptacle in which their minute flowers and true fruits are developed is often popularly called—for their striking habit and for their useful products. Some of them, as the india-rubber producing waringins and kawats species of *Urostigma* (*U. microcarpum*, and *consociatum*), are among the giants of the vegetable world, and its most relentless parasites and tyrants. Brought by some wandering bird or fruit-eating quadruped to the cleft of a high tree, the seed germinating drops down all round its host long tendril-like roots, which in a few seasons become indissoluble bonds that interlace, grow together, and close up the tree-stem that gave it its support, till its life is choked out, and only here and there, before it finally disappears, can it be seen through latticed apertures, like an Inquisition martyr built into the wall. The young kawat grows, shoots upward its top and

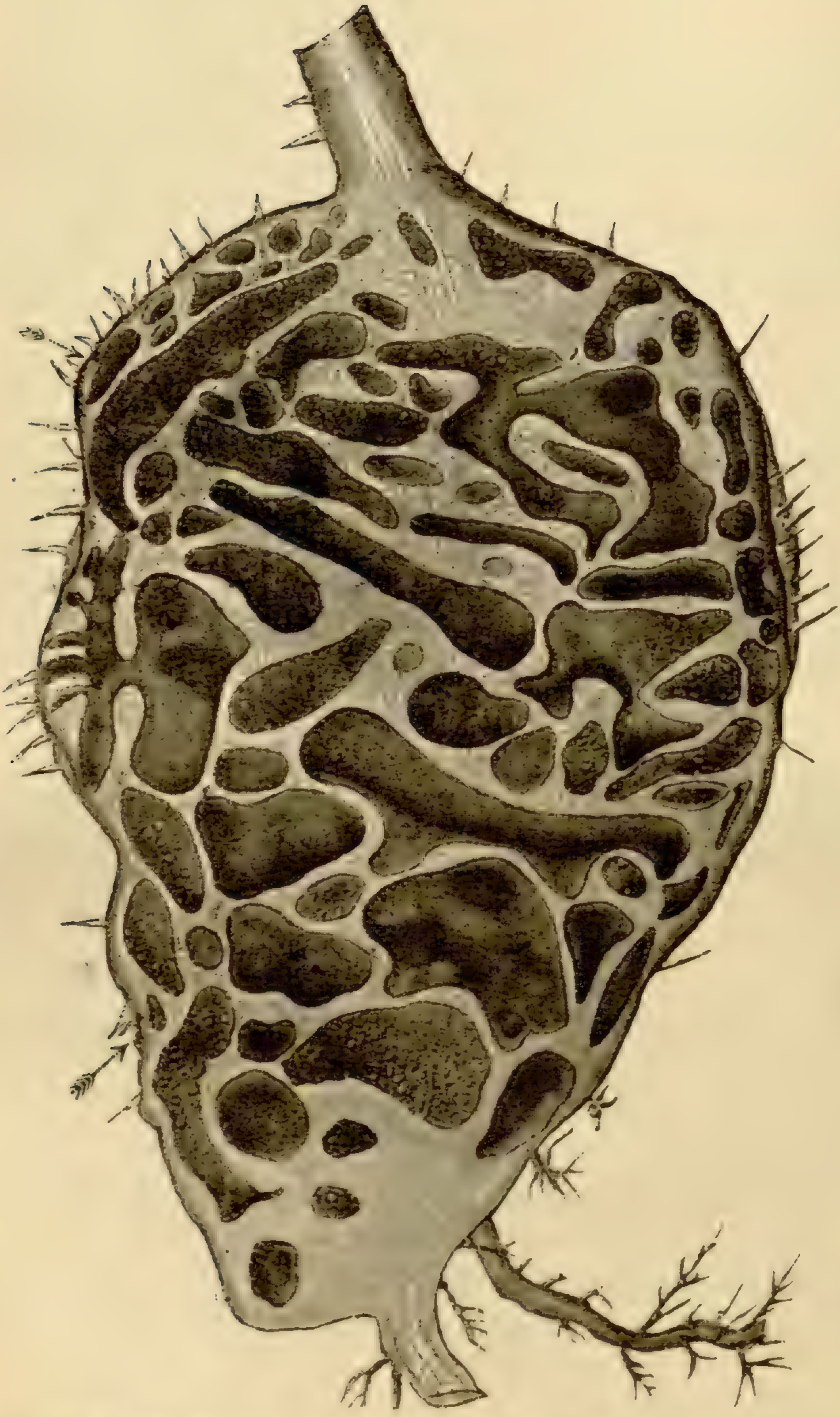
> "spreads her arms,
> Branching so broad and long, that on the ground
> The bended twigs take root; and daughters grow
> About the mother-tree, a pillared shade."

Less stately but not less beautiful are the shrub forms, the species of Hamplas (*Ficus microcarpa*, *amplas*, and *politoria*) whose rough leaves provide the natives with ready-made sand-paper; the *Ficus cordifolia*, the Amismata (*Ficus aspera*), and the Kihedjo—a bushy shrub, whose fruit, always in profusion along its branches, is when ripe of a rich purple hue, and unripe of the brightest vermilion or carmine colour, in brilliant contrast to its dark foliage; while the semi-parasitic climbing *Ficus radicans* delights to cling to the tallest trees of the forest. Its fruit, which is as large as an orange, is put forth throughout the whole extent of its stem in

profuse abundance, massed in clusters in every stage of growth; and as these in their passage to maturity assume all the different brilliant hues by which rich orange changes into the sombre shades of purple, the effect against the background of the tree-stem and of its own singularly chaste foliage is striking in the extreme, and is one of these objects that the eye can meet every day with renewed pleasure.

The highest mountain in this neighbourhood attains an elevation of nearly 5000 feet, and for the last 500 yards of its ascent presented many interesting features. In producing plants rarely found at so low an elevation on higher mountains, the Javan flora on the pure volcanic clay differs from that where the soil is more overlaid with forest humus. Two ferns, a species of *Gleichenia* and the broad-fronded *Dipteris horsfieldi*—here at its lowest altitudinal limit—profusely covered the ground; and, as if stretching their utmost towards the heights where they naturally grow, rhododendrons and a beautiful creeping species of *Ericaceæ* (*Gaultheria repens*) clothed the tops of the tallest trees. The lemon-scented laurel (*Tetranthera citrata*), whose leaves and fruit give out a sweet odour that can be detected a long way off, grew in clumps; and its fruits, a favourite food of the Bulbuls and the Bell-birds, retain their perfume even after they have been dropped by these birds.

At the summit pitcher-plants (*Nepenthes phyllamphora*) appeared in profusion, climbing up the trees and running over the ground among the moss, out of which peeped the delicate bright star-like flowers of the *Agrostemma montanum*, which always reminded me of the pretty European Chickweed Winter-green (*Trientalis europæa*) of our northern woods. On one of the lower knolls I found perhaps the most interesting plant in my Javan collection, a species of *Petræa* (*P. arborea*), growing entirely wild in the forest. This genus, belonging to the family of the *Verbenaceæ*, is almost entirely confined to the South American continent; and it is of extreme interest to find it, in this inexplicable way, cropping up in a region so far removed from the centre of its distribution. A species from the island of Timor occurs, without history, in the collection in the British Museum made by Mr. Robert Brown; but these are the only two examples, so



TRANSVERSE SECTION OF THE STEM OF *Myrmecodia tuberosa*.

far as I am aware, hitherto collected uncultivated in the Old World.

The 14th of June is to me memorable as being the day on which for the first time I saw in its native habitat, and gathered there, that most singular of the vegetable productions of the Indian Archipelago, the *Myrmecodia tuberosa* and *Hydnophytum formicarum*. Their most striking characteristic will be indelibly marked in my remembrance by the sensations other than mental, by which their acquaintance was made.

In tearing down a galaxy of epiphytic orchids from an erythrina tree, I was totally overrun, during the short momentary contact of my hand with the bunch, with myriads of a minute species of ant (*Pheidole javana*), whose every bite was a sting of fire. Beating a precipitous retreat from the spot, I stripped with the haste of desperation, but, like pepper-dust over me, they were writhing and twisting their envenomed jaws in my skin, each little abdomen spitefully quivering with every thrust it made. Going back, when once I had rid myself of my tormentors, to secure the specimens I had gathered, I discovered in the centre of the bunch a singular plant I had never seen before, which I perceived to be the central attraction of the ants. It was called *Kilang-kurak* by my boy, who said it was the home of the ants. I was overjoyed with the revelation that a slice struck off by my knife, made of an intricate honeycombed structure swarming with minute ants—a living formicarium.

In the space of a short search I found, generally high on the trees, abundance of specimens of both genera, which, not without several futile attempts and many imprecations and groanings on the part of my boys, were brought to the ground; and, at the ends of a pole over their shoulders, up which the infuriated dwellers would ascend to spread over their bare bodies to their frequent discomfiture, they were at last safely deposited in a spot in Mr. Lash's garden, where I could examine them with comfort without disturbing their inhabitants.

The accompanying representation (page 80) represents the general appearance of the epiphyte: a spine-covered bulb surmounted by a cylindrical axis bearing leaves and minute

flowers, while the longitudiual section on the opposite page shows the complicate system of galleries—some of them papillated—inhabited by the ants.

Observing the ants often employed in carrying out whitish particles, I at first conjectured that the irritation of their digging out a dwelling must have induced the swelling of the bulb; and, curious to see the *modus operandi* of its commencement, I decided to raise a few of them from seed. This turned my attention to their flowers and fruit. The flowers are produced in deep spine-protected pits on the axis surmounting

YOUNG PLANT OF MYRMECODIA TUBEROSA.

the bulb, and are remarkable for the extreme rapidity with which the cycle of their functional changes are performed. The pellucid white flower appears, and is followed by an orange, watery fruit, whose seeds ripen and often germinate in the little pits where they grow, all within the space of thirty-six hours.

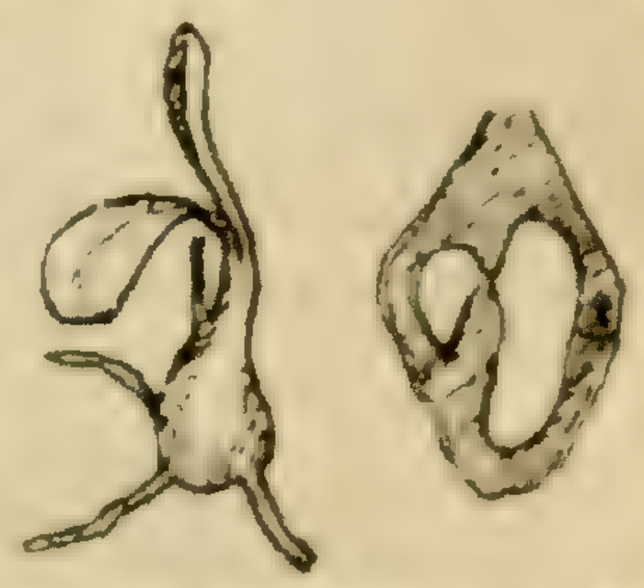
Some years later Dr. Burck, of the Buitenzorg Gardens, most kindly showed me specimens and microscopic slides illustrating some interesting observations * he had made on these flowers: that the corolla segments rarely open (though a slight touch

* These have since been published in the 'Annales du Jardin Botanique du Buitenzorg,' vol. iv., p. 16.

can effect it); that the pollen grains exsert their pollen tubes while still in the anthers; and that both the external and the internal surfaces of the lobes of the pistil are covered with papillæ, indicating that these surfaces are functionally active.

I have never observed these flowers approached by the ants that infest the interior, nor by any other insect, which to gain admission to the flower, even if open, must be very small indeed. The anthers and the pistil do not seem to reach maturity together, yet it would seem that self-fertilisation alone can take place; perhaps the tubes of the pollen grains which fall to the bottom of the corolla manage to reach the lower lobes of the pistil and produce fecundation.

The seeds I planted germinated with great freedom, and I cultivated quite a number of young *Myrmecodia*, whose growth I watched with the greatest interest. Many of them I kept quite isolated from the interference not only of the *Pheidole javana*, which seems to be the only species of ant which lives in these plants in their native state, but of all other species, and I was surprised to find that from their very earliest appearance *this curious galleried structure arose without the presence of the ants*, and that the plants continued to grow and thrive vigorously in their absence as long as I cultivated them. Some bulbs had a single canal reaching to their centre from a round orifice opening generally close to the little tap-root; others presented one or two loculi in the interior, without any communication at first with the exterior, partially full of a spongy substance looking like its own degenerated tissue. These chambers invariably developed a spongy pith—which in a section it was not difficult to trace out in advance in the still fleshy substance—towards and to open at last at one or more spots on the exterior of the bulb. Secondary galleries, arising in the same manner as the primary, soon formed communicating channels, extending with age, throughout the whole of the growing bulb. At a later period, in Amboina, where the *Myrmecodia* and the *Hydnophytum* were very abundant, I found many specimens containing a large central and quite isolated chamber full of water—not rain-water—round which



YOUNG MYRMECODIA, AND SECTION OF A SOMEWHAT OLDER ONE.

radiated the galleries tenanted by ants and their larvæ of the same species as in Java.

Since my original observations, Dr. Melchior Treub, Director of the Botanic Gardens in Buitenzorg, has conducted and published * a series of important researches into the development of these bizarre plants, which have confirmed generally the observations I had made, and have proved besides that what I have called degeneration is the result of a transformation into *cork* of the tissue of the plant; which, becoming entirely dried up, gradually extends the galleries towards the exterior, when the fluffy mass disappears or is carried out by the ants.

Notwithstanding these researches it remains still a mystery what causes the development of these corky cells, what advantage the plant derives from its unusual structure, and what is the mutual benefit of this close relation between insect and plant. That the ants should so persistently infest and yet derive no advantage beyond accommodation from the plant, seems unlikely; it is probable however that the papillæ in the galleries, whose function is still an enigma, may afford some nourishment to them, but that the insects are not absolutely indispensable to the perfect performance of the functions of the plant is certain from Dr. Treub's observations. He suggests that they perhaps ward off enemies from the plant, or that they may remove, for their own nourishment, injurious excretions from the papillæ of these channels whose office may be to distribute air through the fleshy mass of the bulb. Altogether these *Myrmecodia* are among the most singular of vegetable productions, showing us how much we have yet to learn of the intricate processes of nature.

I gathered here another interesting specimen in some leaves of the *Bryophyllum calycinum*. As is well known, the marginal notches of the leaves of this plant, when laid on the ground or in a damp place, produce buds which develop into new plants. In the leaves I gathered here, however, *complete flowers and fruit* were produced directly from the notches.

While botanising in Portugal, in the spring of 1877,† I was remarkably struck by the number of orchids I gathered that

* In the 'Annales,' sup. cit., vol. iii., pp. 130–157, from which the accompanying figures here reproduced are taken.

† *Nature*, vol. xvi. p. 102.

seemed never to have had an effective visit paid them by any of the crowd of bees, butterflies, and beetles, among which they blossomed. They were mostly terrestrial species, *ophrys* chiefly, and were some of them handsome, and very sweetly scented; yet they might as well have wasted their sweetness on the desert air, for scarcely any of them ever lost their pollen masses, or had these fertilising grains applied to their own stigmas. Since then I have carefully examined all orchids that I have encountered, and have been surprised at the immense numbers which—possessing brilliant, small, and not seldom even large flowers, often highly perfumed—never or very rarely produce seed capsules, but which blossom and fall without benefiting in any way their race. At Kosala I was able to continue my observations both on those growing naturally in the forest as well as on those I reared in Mr. Lash's garden, where, after once taking to the trees they were as nearly as possible under natural conditions. The *Cymbidium tricolor* produces flower-spikes often attaining a length of nearly four feet, studded with florets which are rather sombre in colour; yet it could scarcely be passed without attracting admiration. Of the florets of several plants I counted, seventy-nine per cent. had their pollinia intact, after, to all appearance, having been exposed for a long time, and of those that had lost their pollinia not one stigmatic surface had pollen grains applied to it. On another occasion the whole of the florets examined were unvisited; while on a third occasion eighty-nine per cent. of the florets examined had their pollinia safe in the anthers, nine per cent. being damaged, either having lost their labellum or having the column eaten by the larvæ of a species of *Coccinellidæ*. One alone was fructified.

I gathered the rather rare *Cymbidium stapelioides*, growing at a height of 2600 feet above the sea, flowering on a fallen tree. I brought it home, 1000 feet lower, and fixed it to a tree-stem, to which it at once took kindly. None of the flowers which were expanded when I found it were fertilised; but one of the bulbs had a stem with a solitary capsule. For three weeks the plant remained in the condition in which I found it, its large and handsome, though somewhat dull-coloured, flowers retaining their perfect freshness during all this eriod. I then took compassion on its barren state, and fertilised from

their neighbours four of its florets. These alone of the sixteen flowers bore fruit. A couple of months later a fine new spike appeared, which I left to its own resources. For between four and five weeks it exhibited a very fine tross of twelve flowers; but not one seed-capsule was produced. The insect life at the lower station seemed quite as abundant as at the higher. This orchid possesses no nectary, and its odour, if not pleasant, is not disagreeable. The viscid disk of its pollinia is remarkable for its elasticity. After removing a pollen mass from the anther, I applied it to the stigma of another floret, and on withdrawing the pencil to which it was adhering, it sprang back with an audible snap, the viscid disk stretching quite one-eighth of an inch, without leaving pollen on the stigma, for the floret did not set a capsule. The same result followed after allowing the pollen to remain for some seconds in contact with the stigmatic surface. After the lapse of a week the viscid disk still retained its elasticity unimpaired, so much so that I was able to extend it as often as ten times for various distances up to nearly one-fifth of an inch before the connection gave way—a sharp snap always accompanying its relaxation.

One of the prettiest and commonest orchids here was a pure white *Dendrobium* (*D. crumenatum*), which suddenly appears in flower on all the trees of a district nearly on the same day. I have examined many hundreds of flowers, and I am quite sure, though I have not kept very accurate statistics of the numbers, that not one in eighty ever sets a seed capsule.

Growing terrestrially in abundance in damp shady situations is another group of this family belonging to the genus *Calanthe*. *Calanthe veratrifolia* produces quite a dense head of elegant white flowers, but the number of those that become fertilised are in enormous disproportion to those that fall off barren. I have examined plants in numerous localities, in heights amid the dense forest, as well as in more open situations; I have studied them low down, both in the sun and in the deep shade, but have invariably found that a very small proportion produces fruit. Generally the pollinia are found in the anther after the fall of the flower; but often they are absent, without any pollen being left in return on the stigma. In five different plants, out of 360 florets examined,

109 were withering with intact anthers, or had lost their pollen and were unfertilised, 245 had fallen off, six only had produced capsules. These are not selected instances, but the result of the examination of five plants as they occur in my note-book. I have several times found in various species of *Calanthe*, specimens which at first I thought to be *cleistogamously* fertilised, where the ovules were enlarged in the ovary, and the flowers quite open; but close examination has shown that this is the effect of the irritation of a small species of *Hymenoptera*—a *cynips* probably.

Mr. Darwin, in his 'Fertilisation of Orchids,' enumerates but four instances of self-fertilisation as coming under his observation, namely: in *Ophrys apifera*, by the falling forward of its own pollinia, which are then, by the agency of the wind, brought into contact with the stigma—the plant being capable also of cross fertilisation; in *Peristylis viridis*, which is possible to be self-fertilised by its own pollen from the head of the visiting insect; in *Cephalanthera grandiflora*, which is perpetually self-fertilised by its pollen grains that rest against the upper sharp edge of the stigma thrusting down their pollen tubes into the ovary; lastly, *Dendrobium chrysanthum*, which may possibly be self-fertilised by its own peculiar acrobatic pollen. In the additional instances here given, some will be found to be singular and different, I believe, from any hitherto recorded.*

The genus *Phajus* is an exceedingly handsome and attractive coterie of orchids growing in open and sunny places, throwing up from their large broad root leaves, stout erect flower-stalks, one and a-half to two feet in height, crowded with florets. The expanded sepals of *Phajus Blumei* measure laterally from tip to tip twelve to fourteen centimetres. Their external margins are white and interiorly rich chestnut brown; the labellum is of a beautiful bright purple magenta colour, margined with yellowish white. Its fringed mouth forms a broad landing-stage for passing insects, for whose benefit brightly coloured ridges point the way in vain to the nectary, as, unfortunately for the visitor, it rarely con-

* From here to the top of page 96 may be passed over by the general reader not interested in this subject made so fascinating by the studies of Mr. Darwin given in the volume referred to above.

tains any nectar. The column, embraced by the labellum, is massive, expanding into a stigma eleven millimetres broad, secreting an abundance of viscid matter, crowned with the anther and its pollen, whose caudicles, composed of pollen

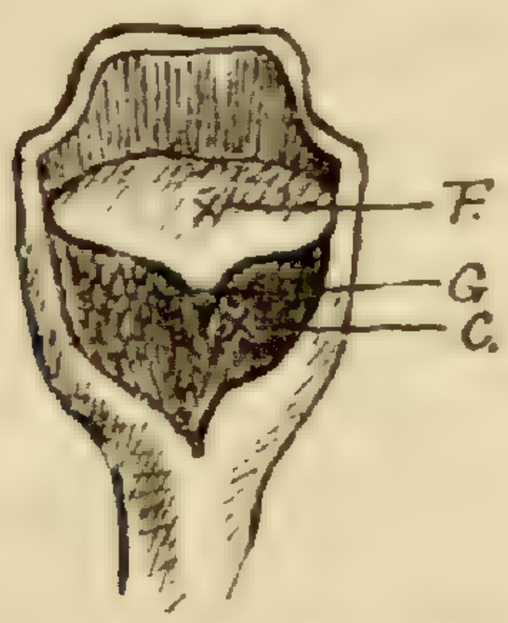


FIG. 1.—PHAJUS BLUMEI, SHOWING ANTHER WITH POLLINIA REMOVED; C, STIGMA; F, BASE OF ANTHER; G, ROSTELLUM.

[*The following figures are all slightly diagrammatic.*]

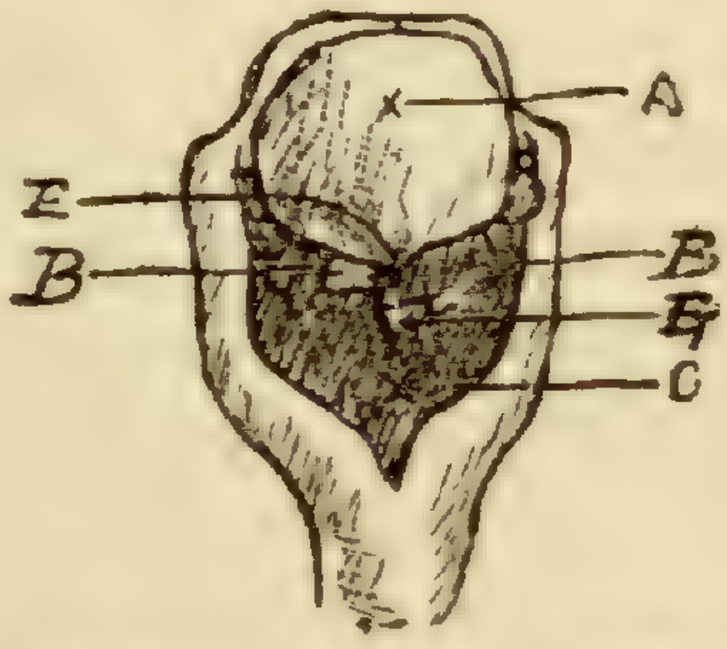


FIG. 2.—PHAJUS BLUMEI, SHOWING THE POLLINIA AVALANCHED DOWNWARDS, CARRYING WITH THEM THE ROSTELLUM, G; A, ANTHER-CAP; B, SWOLLEN POLLINIA; C, STIGMA; E, TIP OF CAUDICLES OF POLLINIA.

grains, protrude their tips from beneath the anther-cap. I examined more than one hundred and fifty flowers of *P. Blumei*, but I did not find one that was not, or could be otherwise than, self-fertilised. Its essential organs exist in two forms, slightly but interestingly different.

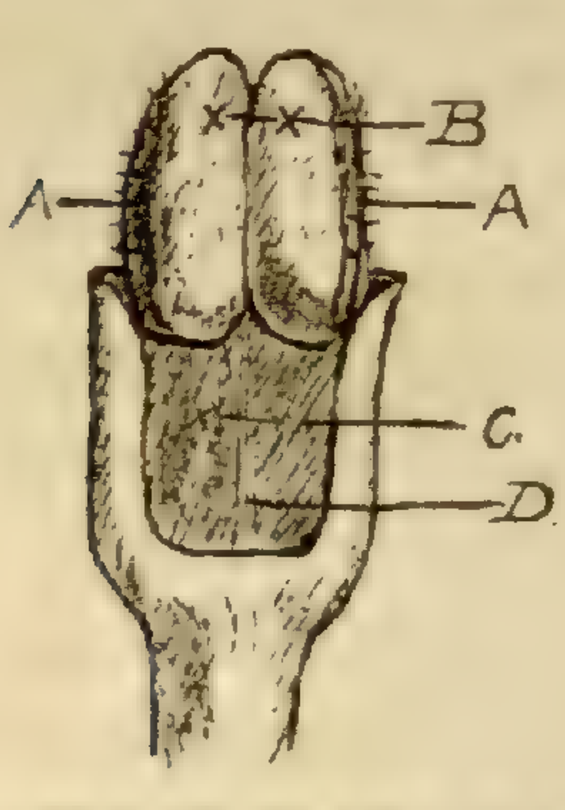


FIG. 3.—BUD OF PHAJUS BLUMEI, SHOWING POLLINIA IN ERECT POSITION; A, ANTHER-CAP; B, POLLINIA; C, STIGMA; D, MEDIAN RIDGE.

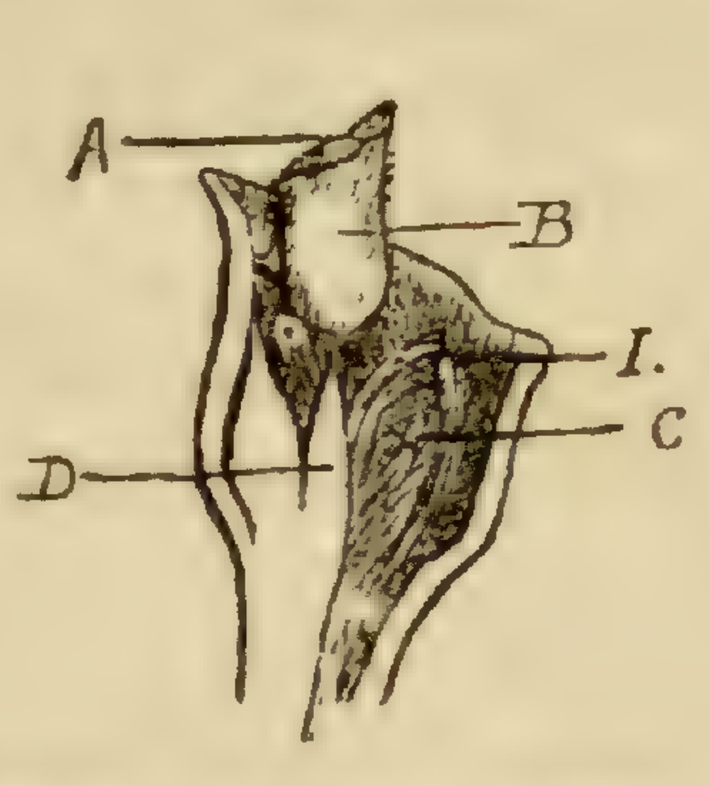


FIG. 4.—LONGITUDINAL SECTION OF COLUMN OF PHAJUS BLUMEI (SIDE VIEW); A, B, C, D, AS IN FIG. 3; I, BOUNDARY OF STIGMA.

Flowers of the first form have, arching over the deep and covered stigma, a well-developed tongue-shaped projection or rostellum, on which lie the caudicles of the pollinia, which have no viscid disk (Fig. 1). On each side, the rostellum leaves between itself and the external walls of the column a

narrow channel by which the viscid matter of the stigma reaches the anther. In examining an advanced bud, the viscid matter of the stigma is seen to be in large quantity and rather liquid. It increases with the growth of the flower till it overflows,—often before the bud opens—and, immediately on its opening, inundates the pollinia, which now increase in size, and either avalanche downwards, sometimes quite obliterating the rostellum (Fig. 2, p. 86); or, while retaining their position in the anther, emit their tubes over the narrower portion of the rostellum into the stylary canal. Very often both anther and stigma become quite filled up by the multitude of pollen-tubes and by the swollen pollinia. All these plants produced large and well-filled seed-capsules on every flower; but I

FIG. 5.—PHAJUS BLUMEI, SHOWING THE ANTHER ROTATED DOWNWARDS; A, C, AS IN FIG. 3.

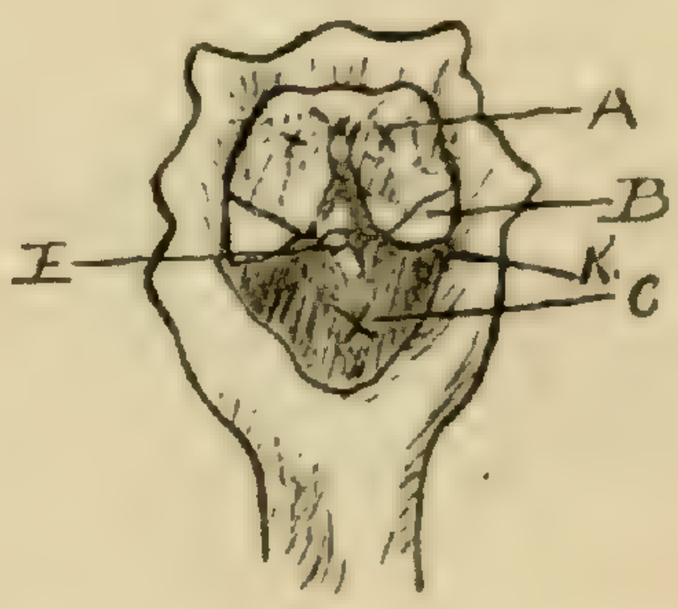


FIG. 6.—PHAJUS BLUMEI, SHOWING A MORE ADVANCED STAGE THAN FIG. 5; THE ANTHER-CAP A, HAS OPENED; B, SWOLLEN POLLINIA; C, E, AS IN FIG. 2; K, TIP OF ANTHER-CAP.

never saw an insect visit the plants during all my observations, although the plants were situated where I could inspect them constantly throughout the day or night.

Of flowers of the second form, I examined many more examples. Here there is no rostellum, nevertheless the boundaries of the stigma are quite distinct (Figs. 3, 4, p. 86). On examining a young *bud*, the anther (enclosing the pollinia) is seen standing vertically erect on the top of the column—i.e. of the detached column, without reference to its position in the flower—forming as it were a pointed extension of it, and attached to it by its minute filament. As the flower progresses in growth, the anther-cap ruptures and rotates forward. When it has descended through about 90°, it occupies (Fig. 5) the position which, if it possessed a rostellum, it would naturally retain; but, having

none, it continues to rotate through about 70° more, till it comes into contact with the face of the column, that is with the stigmatic cavity, which is very large, broad and full of viscid matter (Fig. 6). The whole surface of the lower four pollinia come into contact with the viscid matter and sink well into it, while the viscid matter finds its way gradually about all of the pollinia. The inner members of the upper row of pollinia sometimes escape this inundation, but it seems of little avail to the plant for its cross-fertilisation, for they remain throughout covered by the anther-cap. The tips of the caudicles, however, remain in most cases unaffected throughout, but I have found it difficult to remove any of their pollen grains. The inundated pollinia have no obstacles to bar the way of their tubes to the ovary. On clearing out with a blunt instrument

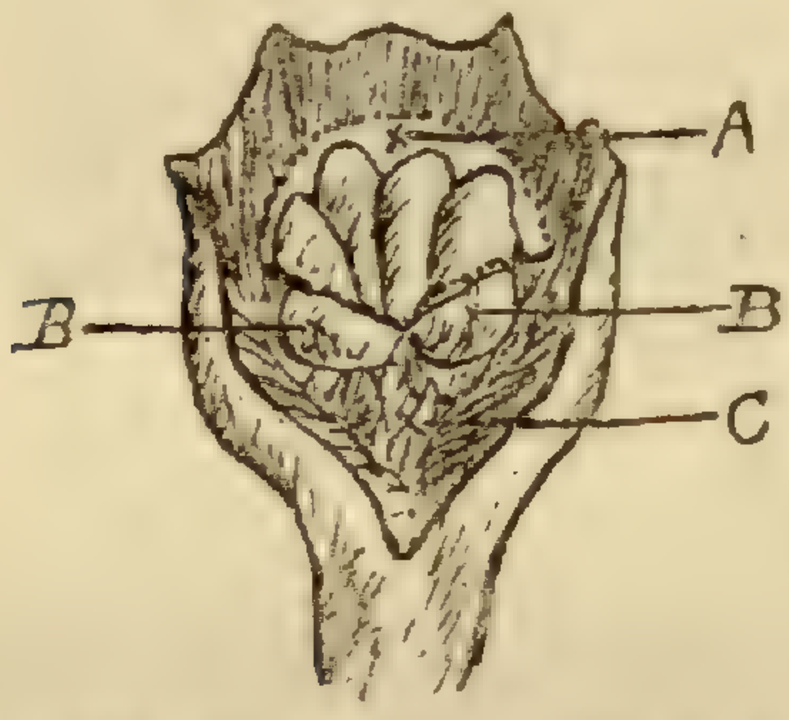


FIG. 7.—PHAJUS BLUMEI, SAME AS FIG. 6, WITH ANTHER-CAP MERELY DOTTED IN; A, B, C, AS IN PREVIOUS FIGURES.

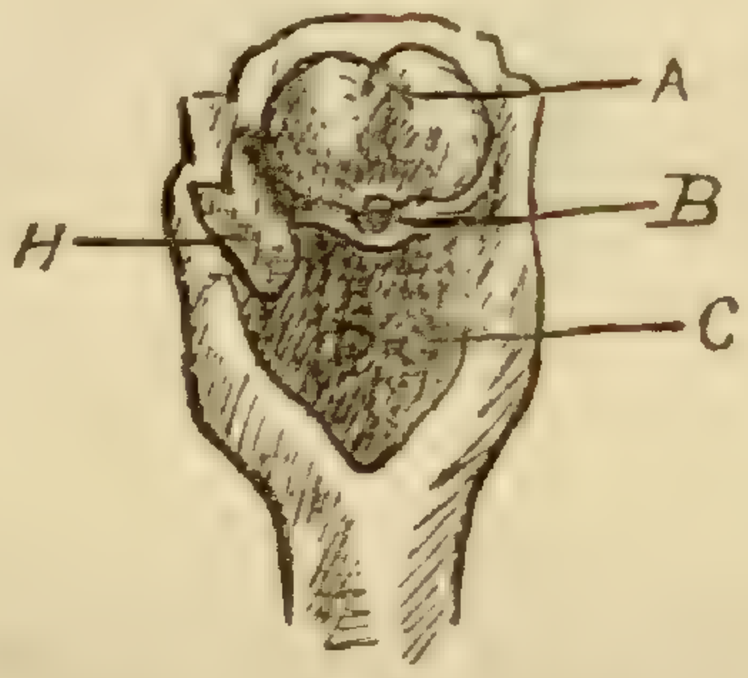


FIG. 8.—PHAJUS BLUMEI, SHOWING EXTRA ANTHER, H; A, B, C, AS IN PREVIOUS FIGURES.

the swollen pollinia from the stigma, it can be seen that from nearly the top of the column, along the posterior median line, a prominent ridge (Fig. 3, p. 86) runs down almost to the ovarium. In the light afforded by the dissection of an *Arundina speciosa* (to be mentioned below) this would appear to represent the absent rostellum. Large seed-capsules were produced by every flower of this form. This *Phajus* is also remarkable for producing, at times two, supernumerary anthers on the top of the column one on each side of the normal anthers (Fig. 8).

Here then we have an orchid whose flowers present every attraction to insects to pay at least a first visit (when they would find no nectar), all of them gay, with a nectary, and a beautifully painted and finger-posted labellum, yet rarely possible to be anything but self-fertilised.

I have examined other species of the genus, and found them to be fertilised in almost identically the same manner.

A not uncommon orchid by the sides of second-growth forest or banks of streams over all the Archipelago, is the

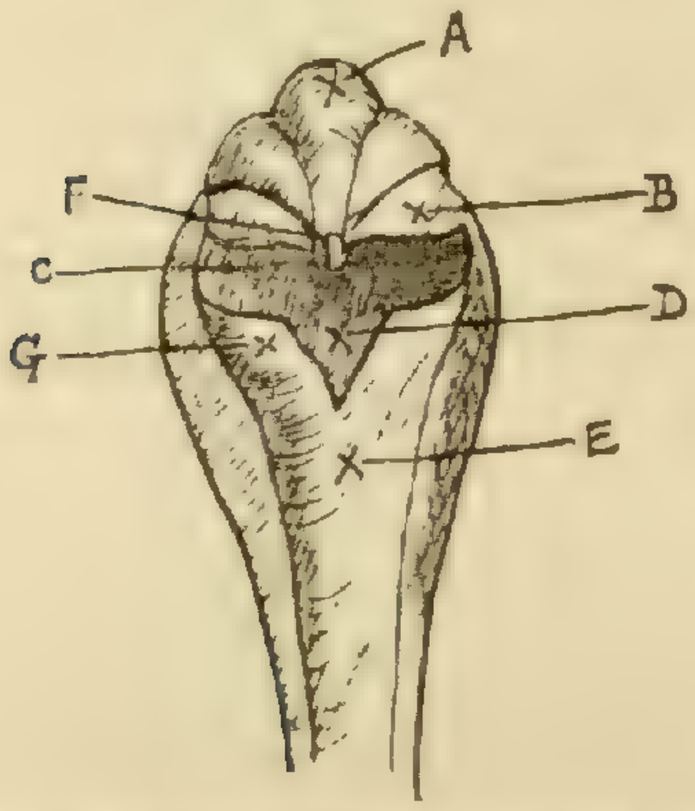


FIG. 9.—SPATHOGLOTTIS PLICATA (FRONT VIEW); A, ANTHER-CAP; B, POLLINIA; C, CAUDICLES OF POLLINIA; D, STIGMA; E, FRONT OF COLUMN; F, TIP OF ANTHER-CAP; G, FLAP OF MARGIN OF STIGMA.

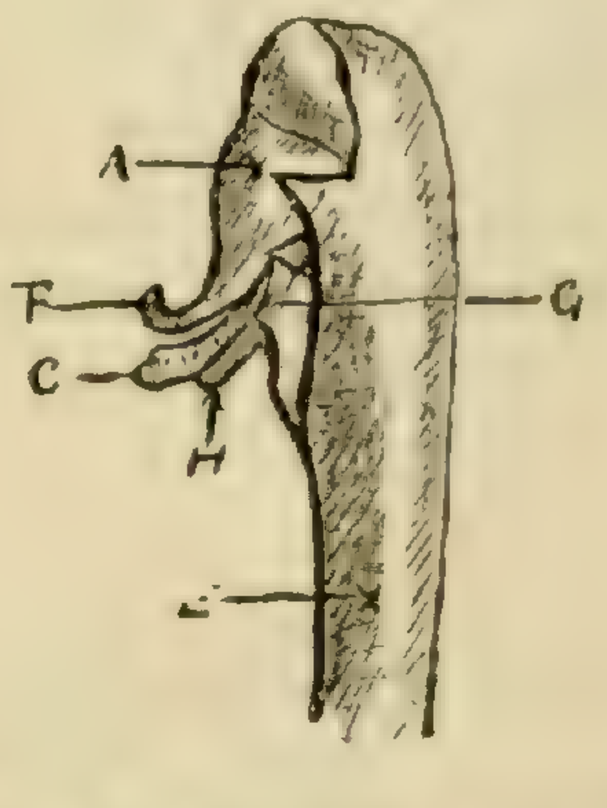


FIG. 10.—SPATHOGLOTTIS PLICATA (SIDE VIEW), WHEN ANTHER HAS ROTATED DOWNWARDS; A, C, E, F, G, AS IN FIG. 9; H, ROSTELLUM.

white or purple terrestrial orchid *Spathoglottis plicata*, Bl., whose method of fertilisation differs from that of the *Phajus*. Its pollinia lie in a rather deep anther, which runs out into a

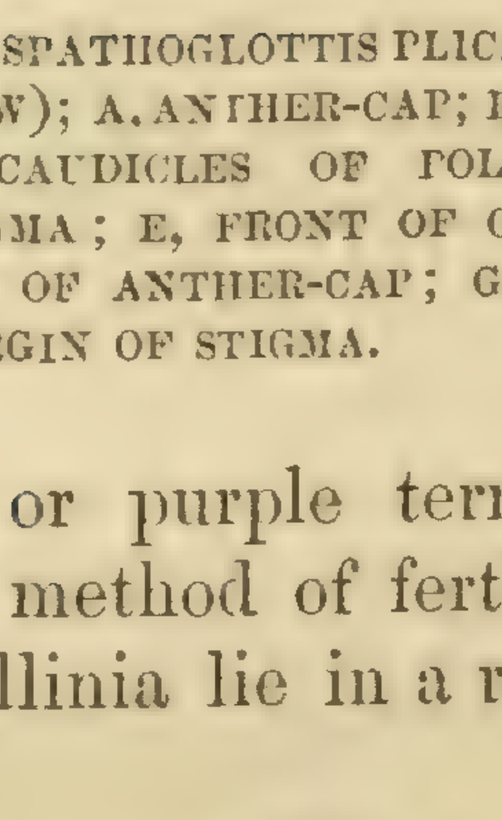


FIG. 11. — SPATHOGLOTTIS PLICATA, LONGITUDINAL SECTION (SIDE VIEW); A, C, E, F, H, AS IN PREVIOUS FIGURE; B, POLLINIA. [DIAGRAMMATIC.]

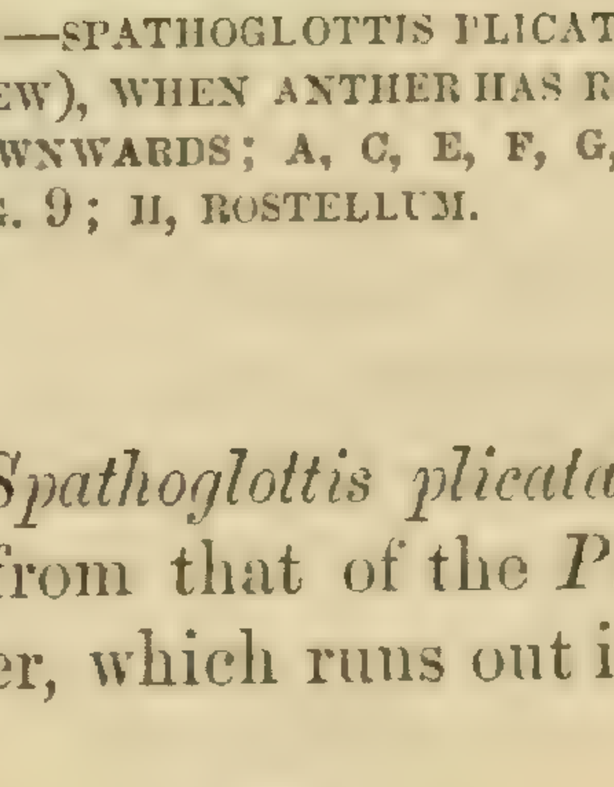


FIG. 12. — SPATHOGLOTTIS PLICATA. (FRONT VIEW), WITH THE ANTHER ROTATED DOWN OVER THE STIGMA; LETTERS SAME AS IN PREVIOUS FIGURES.

long sharp triangular rostellum far overarching the stigma (Figs. 10, 11). The pollinia-caudicles, composed of pollen grains, protrude from below the anther case and lie on the rostellum, projecting a little beyond its tip, as seen in the lateral view of

the longitudinal section, Fig. 10. The stigma is triangular, with its apex downwards. There is no nectary. The stigmatic substance becomes viscid even in the young bud; and as soon as the anther has rotated into its normal position, it begins to increase in quantity—the increase is often so great that it bulges out in front of the rim of the stigma—and, swelling up, flows over into the anther by the canals (seen in Fig. 15), between the column and the edge of the rostellum. Even before the opening of the flower I have found the external pollen masses on each side bathed with the stigmatic fluid, and already exserting their tubes. These descend by the grooves I have mentioned on both sides to the stylary canal. Concomitant with the flooding of the anther there has been taking place a slow approximation of the under side of the rostellum to the lower lip of the stigma, till its lobes finally embrace the rostellum, binding down the whole anther (Figs. 10, 12), so that when the act of fertilisation has been completed the stigma is almost obliterated, leaving no room for any foreign pollen to be applied to its surface. The direction taken by the pollen tubes is shown somewhat diagrammatically in Fig. 14. The pollen grains of the caudicles of the pollinia remain as a rule unaffected, but, not being at all viscid, they are not easily

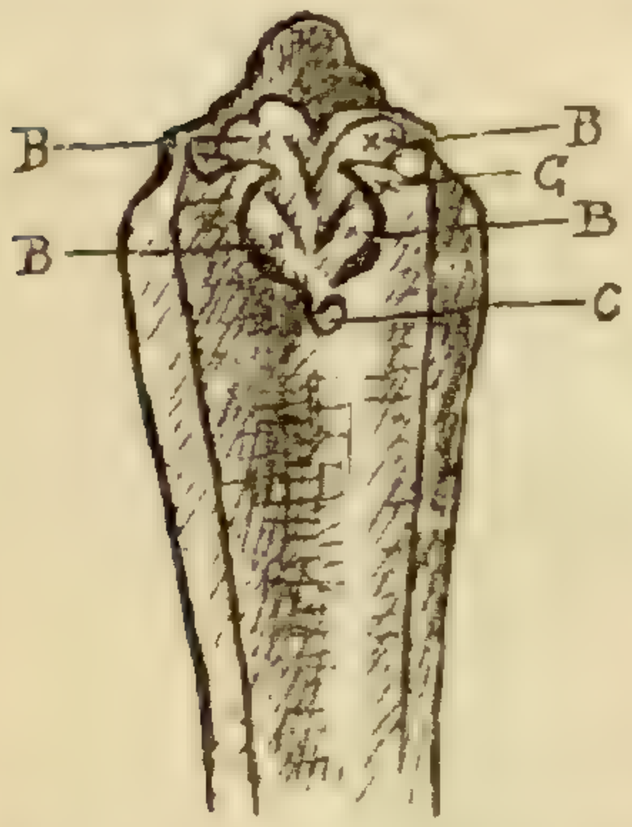


FIG. 13.—SPATHOGLOTTIS PLICATA SAME AS FIG. 12, BUT WITH ANTHER-CAP REMOVED; B, C, G, AS IN FIG. 12.

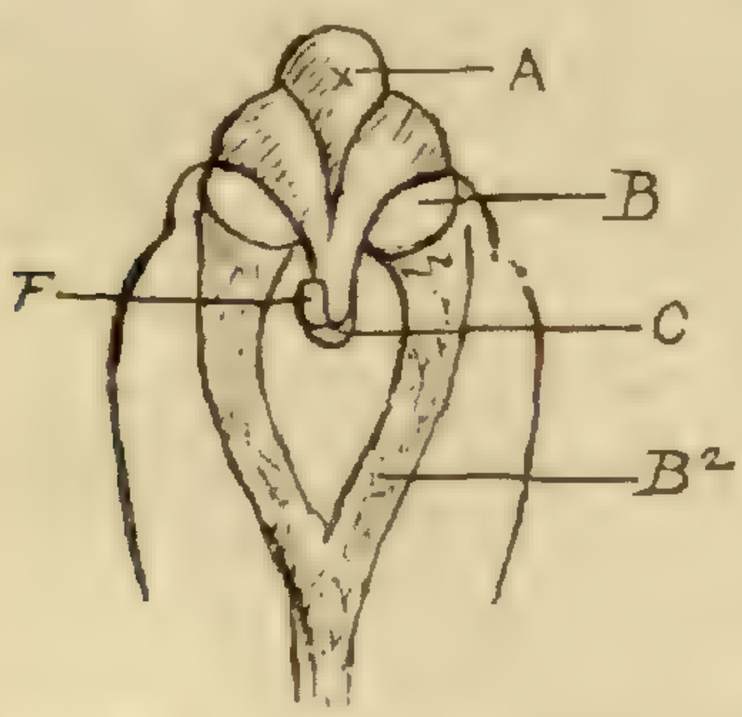


FIG. 14.—SPATHOGLOTTIS PLICATA (FRONT VIEW) DIAGRAMMATIC, SHOWING ROUTE TO THE STYLARY CANAL TAKEN BY POLLEN TUBES, B^2; A, B, C, F, AS IN FIG. 10.

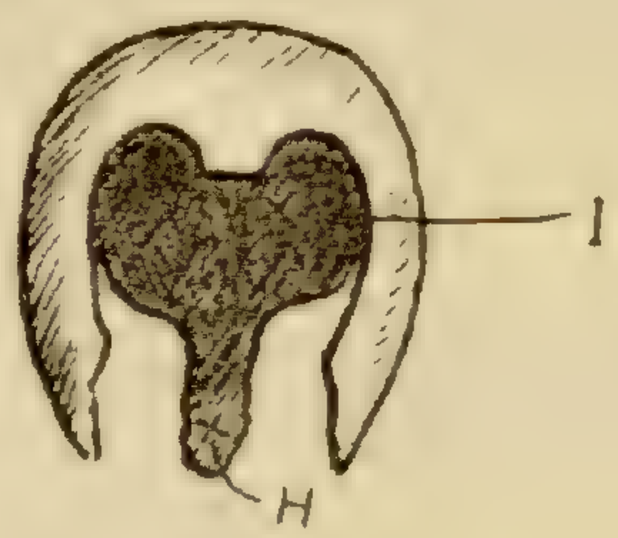


FIG. 15.—SPATHOGLOTTIS PLICATA; THE APEX OF THE COLUMN, WITH THE POLLINIA REMOVED; SHOWING THE MARGINAL CANALS BETWEEN THE COLUMN-WALL AND THE FLOOR, I, OF THE ANTHER; H, THE ROSTELLUM.

removable. The operations here described are often completed before the opening of the *Spathoglottis* at all.

Of the orchids I gathered here none interested me more

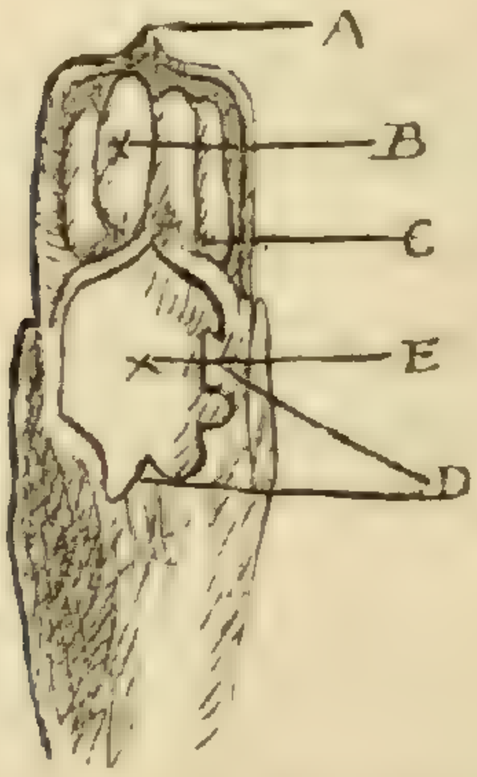


FIG. 16.—ARUNDINA SPECIOSA; A, B, E, AS FIG. 17; C, UPPER MARGIN, AND D, LOWER AND SIDE FLAPS OF STIGMA.

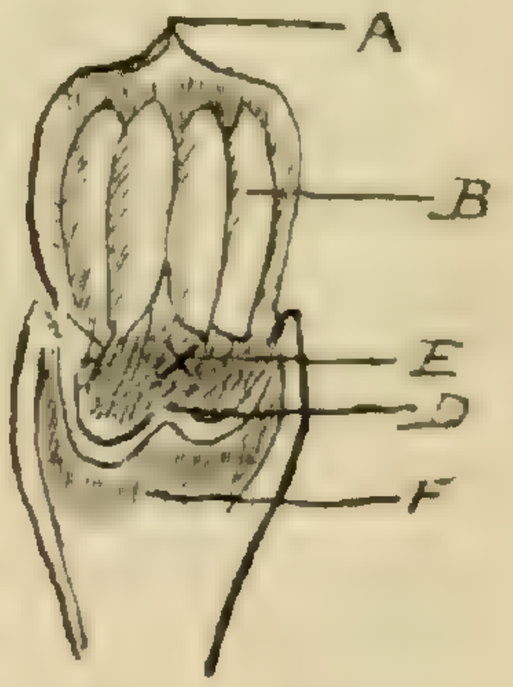


FIG. 17.—ARUNDINA SPECIOSA (BUD); A, TOP OF CREST OF ANTHER-CAP; B, POLLINIA; D, LOWER MARGIN OF STIGMA; E, STIGMA; F, FRONT OF COLUMN.

than the *Arundina speciosa*, Bl. This cane-like species grows to a height of between five and six feet, producing without intermission for many months a succession of large and beautiful purple flowers. The labellum is tubular, and has a

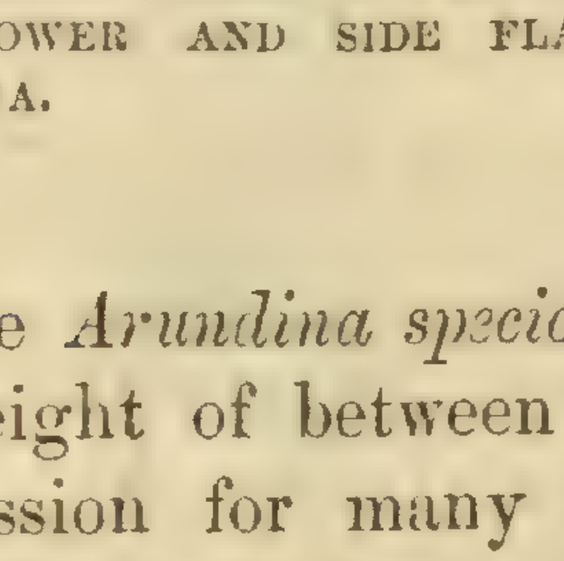


FIG. 18.—ARUNDINA SPECIOSA SHOWING ANTHER QUITE ROTATED INTO STIGMA; D, LOWER FLAPS OF STIGMA CLOSING DOWN ANTHER-CAP; A, F, AS IN FIG. 17.

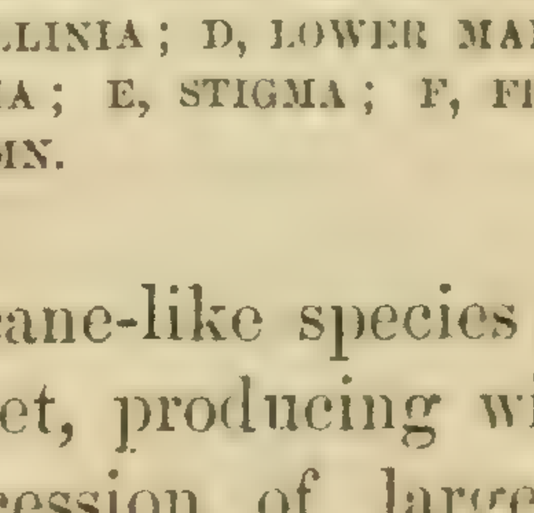


FIG. 19.—ARUNDINA SPECIOSA SHOWING POLLINIA ROTATED INTO STIGMA AND THE FRONT OF COLUMN, F, BURST WITH SWOLLEN POLLEN TUBES. ANTHER-CAP REMOVED.

broad fringed dark purple margin, from which radiate deeper lines converging towards the bright yellow throat, where they merge in two ridges leading to the shallow nectar-depression at the base of the column.

In the very young bud (Fig. 16) the column is crowned with

its anther erect on the posterior part of the column. Underneath is the stigma, of a roughly square shape, its upper rim standing erect in front of the pollinia, rising to about one third of their height as a triangular eminence, which corresponds with the front margin of the rostellar platform. It is not in every flower that the shape of the stigma can be seen well, for the stage presently to be described begins very soon, often before the flower is expanded; and only by the examination of a very large series have I been able to follow the modifications that have occurred.

Concurrent with or even before the commencement of the rotation of the anther into its normal position some in-

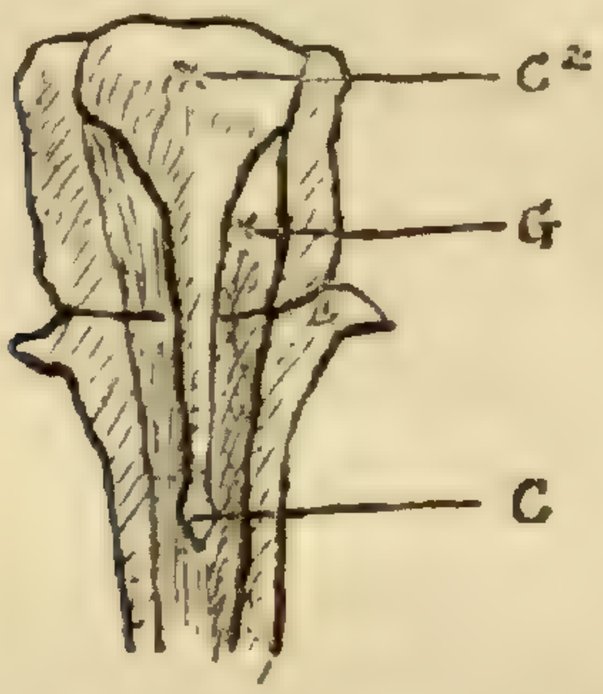


FIG. 20.—ARUNDINA SPECIOSA, SHOWING A SECTION OF COLUMN OPENED FROM BEHIND; C, TOP OF UPPER MARGIN OF STIGMA (CORRESPONDING TO ROSTELLUM); C^2, PORTION OF STIGMA; G, STYLARY CANAL.

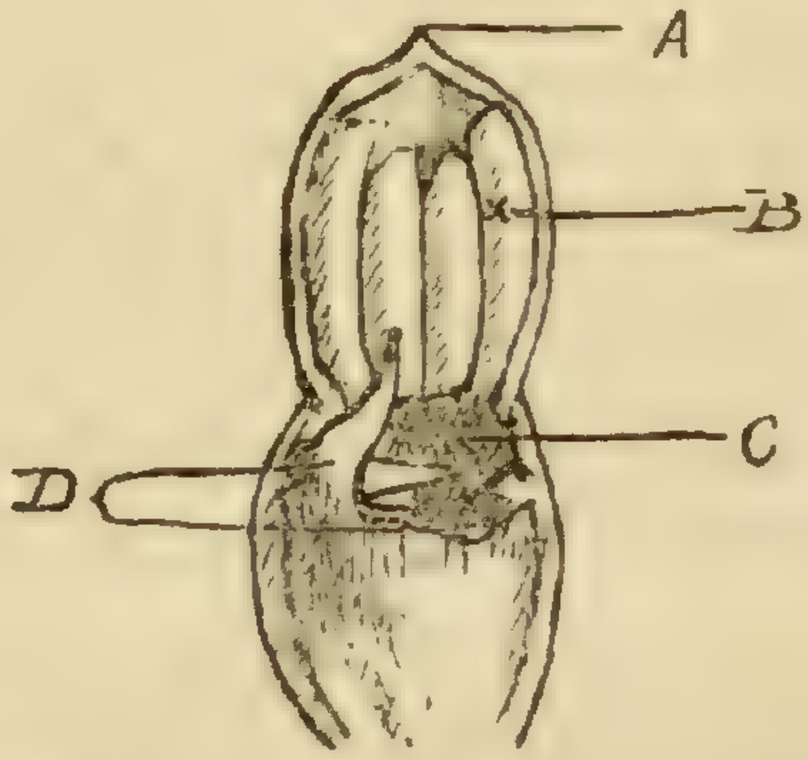


FIG. 21.—ARUNDINA SPECIOSA, BUD SHOWING THE UPPER RIM OF STIGMA ALREADY INVERTED DOWN THE STYLARY CANAL; LETTERS AS IN FIG. 17.

fluence—which I do not know—causes the upper margin of the stigma to become inverted close down the *posterior* wall of the stylary canal, as seen in Fig. 17, and in longitudinal section *opened from behind* in Fig. 20, where the rostellum is seen hanging down the canal as a narrow band. Fig. 21 represents a very young bud, in which, though the pollinia had scarcely begun to rotate, the stigma had become already much modified, and is in waiting for the rotation of the pollinia. Along with this invagination of the upper margin of the stigma (the rostellum) its lower lip is in consequence dragged (?) upwards. Dissections of the column showed that the rostellum goes on elongating down the stylary canal, as in Fig. 20, while the pollinia, slowly continuing to rotate downwards, finally precipitate themselves into the stigma, whose flap-like margins embrace the

anther-cap, as seen in Fig. 18 and in 19, where the anther-cap is removed.

On the conclusion of these singular movements no remains of the stigma can be seen. As a rule these operations are concluded before the full expanding of the flower, whose petals, after remaining expanded for only a few hours, fade, and, closing round the column, exclude any intruder from disturbing the interesting and mysterious rites of nature being enacted within. I have found that in some cases the rostellum (the upper margin of the stigma) is not invaginated down the stylary canal, but retains the more natural orchideal form of a broad flat floor to the anther, projecting far over the stigma as seen in Fig. 22. When the flower of *Arundina speciosa* has this rare form it invariably, as far as my observations enable me to speak, falls off *unfertilised*. The pollinia also lie far back in the anther, and are entirely concealed by the anther-case, which fits close down all round. An insect, to secure the pollinia, would require to alight on the

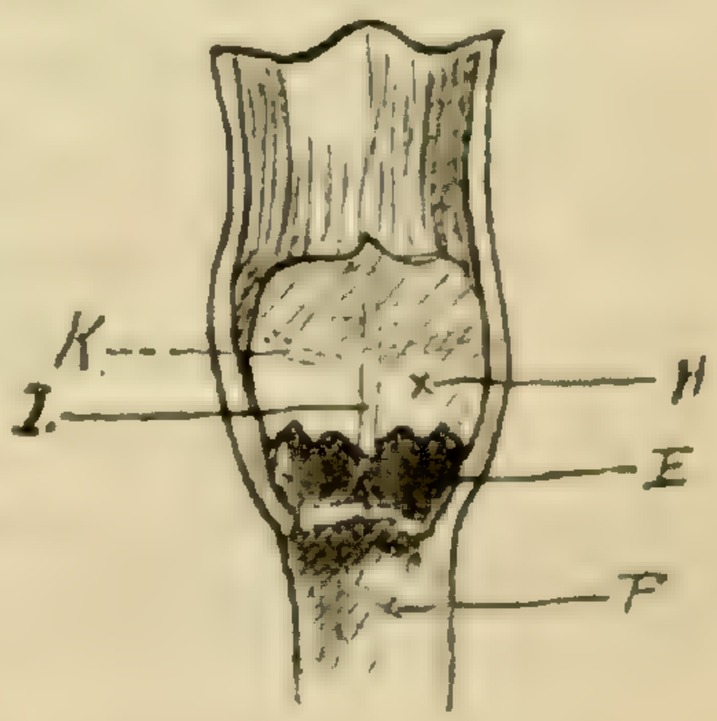


FIG. 22.—ARUNDINA SPECIOSA, SHOWING THE SECOND FORM OF FLOWER; E, F, AS IN FIG. 16; I, RIDGE ON FLOOR OF ANTHER H; K, BOUNDARY OF ANTHER-CAP.

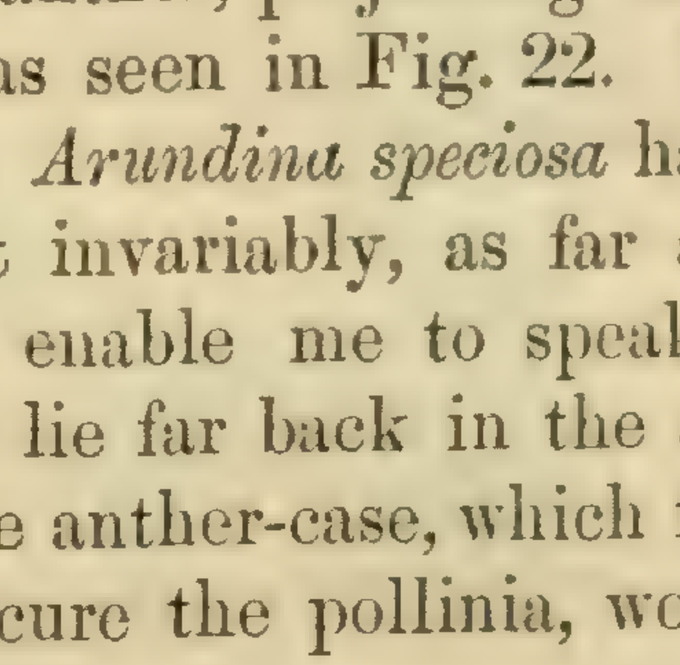


FIG. 23.

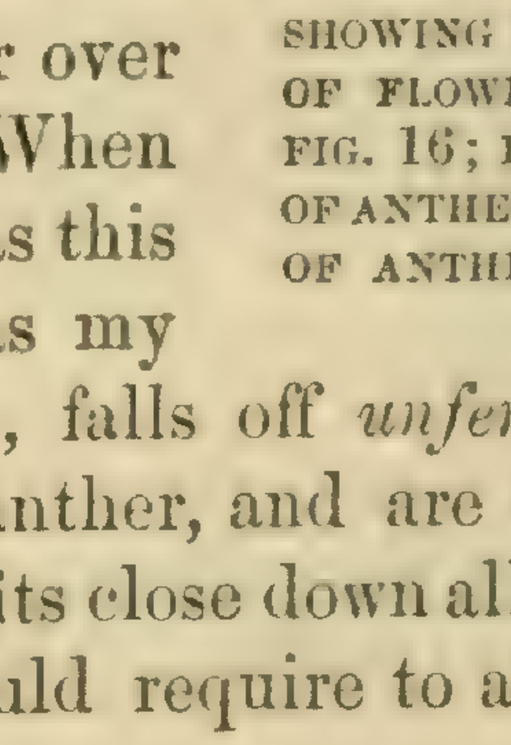


FIG. 24.

FIGS. 23 AND 24.—ERIA SP., NEAR TO E. JAVENSIS; A, ANTHER-CAP, IN FIG. 23, SHRIVELLED UP; B, POLLINIA; B^2, POLLINIA SWOLLEN AFTER FALLING INTO STIGMA; D, ROSTELLUM; E, STIGMA.

margin of the rostellar platform and lift up the anther case, a difficult operation, which supposing it to have successfully accomplished, it might wander far to find a stigma to apply the pollen so obtained to, for its own form of organs does not

probably occur on a second floret of its own species, within a wide area. Flowers with this conformation, however, remain expanded and fresh for several days, in marked contrast to those of the first form, which close up in a very few hours.

In the median line of the upper surface of the rostellum there is a well-marked ridge (Fig. 22) which runs out to the tip to form the central promontory of the rostellum. In describing *Phajus Blumei* I remarked that there existed on the back of the stigma a prominent ridge running down nearly to the ovary. Now if we were to suppose the ridged rostellum of *Arundina* to become adherent to the back of the stigma instead of hanging down free, we should have such a ridge as is seen in

FIG. 25.

FIG. 25.—CHRYSOGLOSSUM SP. THE FIG. ON THE LEFT REPRESENTS TWO FLORETS ON FLOWER STEM; THAT ON THE RIGHT ONE CLEISTOGAMOUSLY FERTILISED.

Phajus; so that it is probable that the ridge in the latter plant may be the remnant of its rostellum adherent to the back of the stigma.

Abundant on trees at 2000 feet above the sea, I gathered the dull-flowered *Eria albido-tomentosa*, remarkable for having its perianth densely covered with a felty mass of white wool. Its anther is separated by a rim-like rostellum from the broad and rather shallow stigma. Out of sixty flowers which I examined at various times, I did not find one otherwise than self-fertilised while still in the bud, by the viscid matter of the stigma swelling

up and inundating, by the channels at the side of the rostellum, at least the most external pollen masses on each side. These pollinia emit their tubes over the rim of the rostellum, almost obliterating it, into the stylary canal. On the opening of the flower and the retraction of the anther-case, the most internal pollinia may sometimes be found in the condition of loose grains unaffected by the inundation of viscid matter. In its fertilisation this species of *Eria* seems to resemble *Dendrobium chrysanthum*.

The mode of fertilisation described as occurring in *Ophrys apifera* by Mr. Darwin, I found to be followed very closely by a species of *Eria* near to *E. javensis*, in which the anther-cap shrivels up backwards after rupturing, so as to disclose the

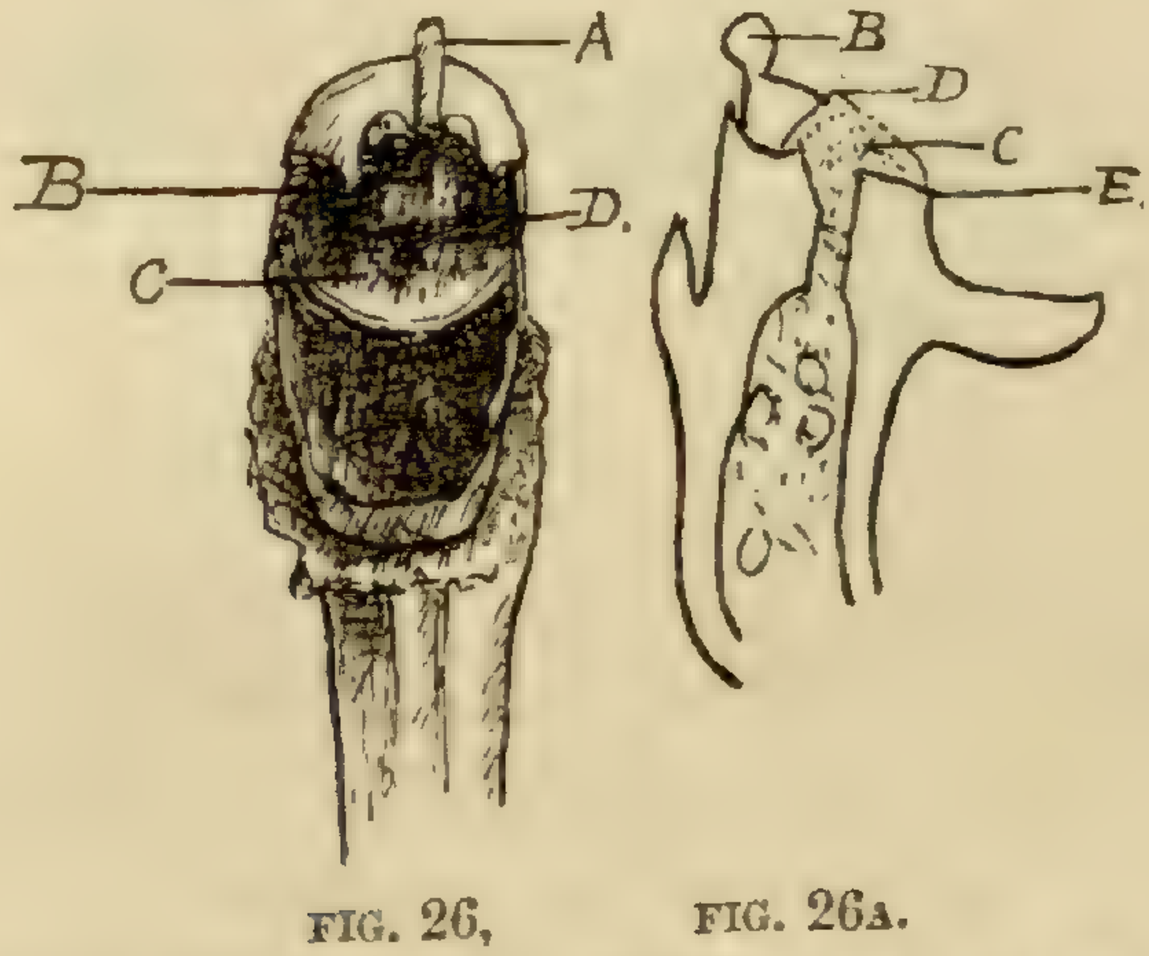


FIG. 26, FIG. 26A.

FIG. 26.—CHRYSOGLOSSUM SP.; A, ANTHER-CAP; B, POLLINIA IN SITU; C, STIGMA; D, UPPER MARGIN OF STIGMA; E, LOWER MARGIN OF STIGMA. FIG. 26A.—SECTION OF SAME. THE VISCID MATTER FLOWS OVER THE MARGIN, D, INTO THE ANTHER.

pollinia, which at once, even when quite shaded from wind and all other disturbances, begin a slow tortuous movement, during which they fall into their own stigmas, as seen in Fig. 23, p. 93.

In a species of terrestrial orchid unknown to me, but nearly related, if not belonging to the genus *Chrysoglossum*, I found these contrivances for effecting self-fertilisation carried to their extreme limit, by its fertilising itself without ever opening its florets at all (Figs. 25, 26). I observed them in the forest, as well as grew a few of them in Mr. Lash's garden, and every specimen was fertilised in the same way. In opening

its locked-up petals, I found the labellum beautifully marked with lines of purple, carmine and orange, and the column also; but no insect eye could ever be fascinated or allured by its painted whorls.

In the rather inconspicuous *Goodyera procera* self-fertilisation takes place by the swelling up of the viscid matter of the stigma beyond its true boundary, till it touches, as seen in Fig. 28, the viscid disk of the pollinia, and spreads into the pollinia chamber. I have no doubt this takes place in many other species of *Goodyera*, and very probably also in our own Highland species, *Goodyera repens*. Other species which I have

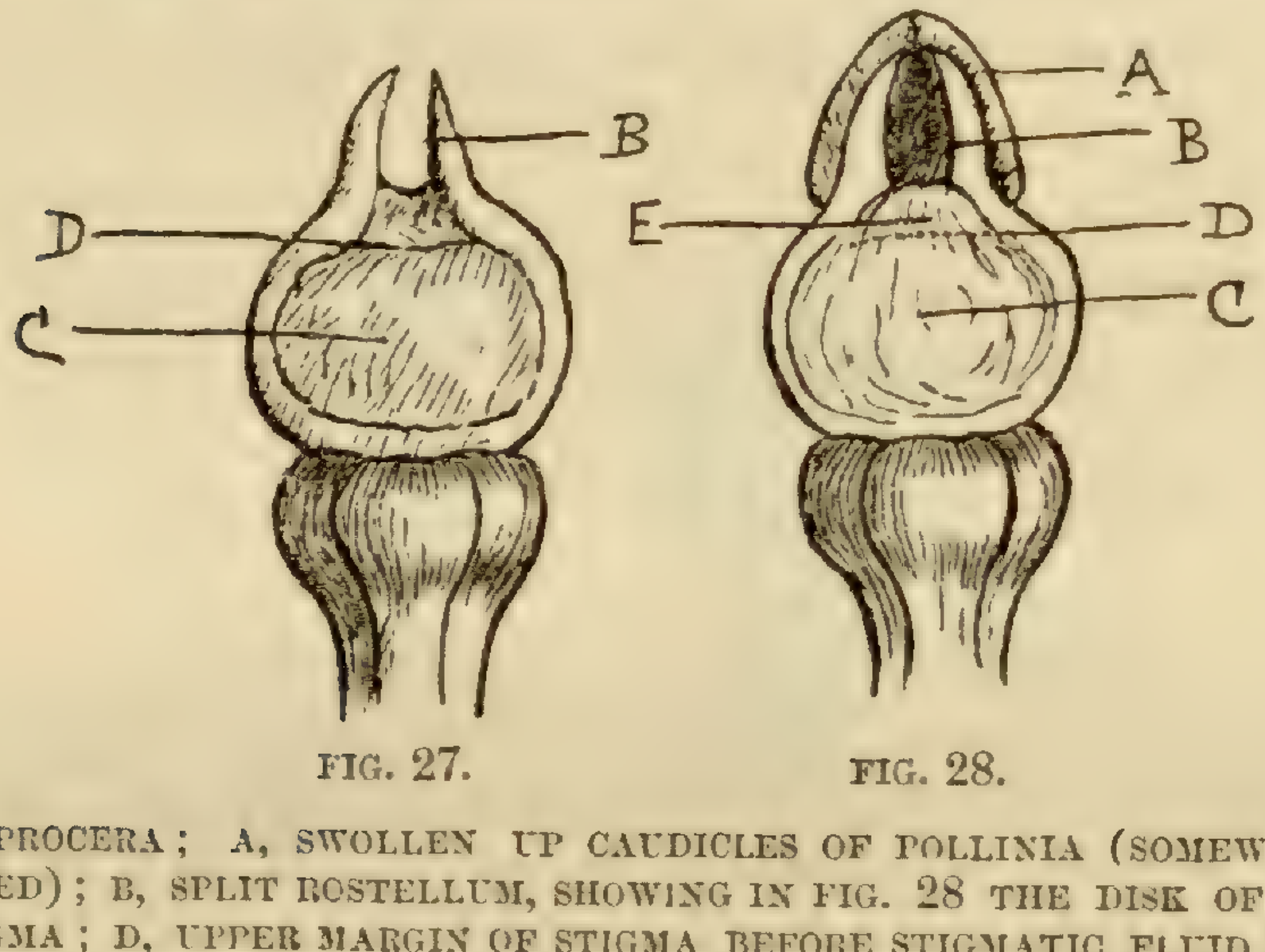


FIG. 27. FIG. 28.

GOODYERA PROCERA; A, SWOLLEN UP CAUDICLES OF POLLINIA (SOMEWHAT EXAGGERATED); B, SPLIT ROSTELLUM, SHOWING IN FIG. 28 THE DISK OF POLLINIA; C, STIGMA; D, UPPER MARGIN OF STIGMA BEFORE STIGMATIC FLUID HAS BEGUN TO SWELL; E, THE STIGMATIC FLUID SWOLLEN UP.

not been able to designate by name presented similar or allied modifications for securing self-fertilisation.

To me was especially interesting the purple *Arundina*, which one might imagine to have become tired of vainly displaying its beauty to wayward and inappreciate butterflies and bees, and had assumed a form that should—let all the glittering humming wings pass heedless as they would—perpetuate a fertile race.

These instances go to show that the rule that "the flowers of orchids are fertilised by the pollen of other flowers" is not so universal as has been supposed. It is to be feared that too often the interesting cases of flowers observed to be cross-fertilised by insects have been recorded, while those of flowers otherwise fertilised have not been mentioned, so that the law

of cross-fertilisation in orchids has been in danger of being unduly magnified, from the absence of evidence on the other side.

The estate of Kosala derives its name from the rounded hill above the house. The word is of Sanscrit origin, but its meaning is unknown. It is a country along the bank of the Sarayu, forming a part of the modern province of Oude. It was the pristine kingdom of a solar race, and in the time of Buddha its principal city was Sewet (Srâvastî). There is another Kosala in the Deccan (Dakshina Kosala); so Kosala or Kusala is the name of a land or a race. *Ala* occurs as a termination in many names of countries, but the root *Kósh* or *Kush* has such an immense variety of significations that it is impossible to find a good translation for it.

The city of Sewet in Kosala was visited in A.D. 401 by the Chinese Buddhist pilgrim Fah-hian, and where he saw the famous sandal-wood figure made by order of the king of Kosala. He found at some distance from the city a copse called Aptanêtravana ("recovered sight"), where originally five hundred blind men lived who were restored to sight by Buddha. The blind men threw their staves on the ground, which forthwith grew up into trees and formed a sacred grove or copse. The name has most probably come down from Hindoo times to the present associated with some sacred legend whose influence hovers still over the spot; for when the coffee gardens were being made the natives refused to fell the forest that grew on the Kosala hill, and only under compulsion could they then be persuaded to enter it.

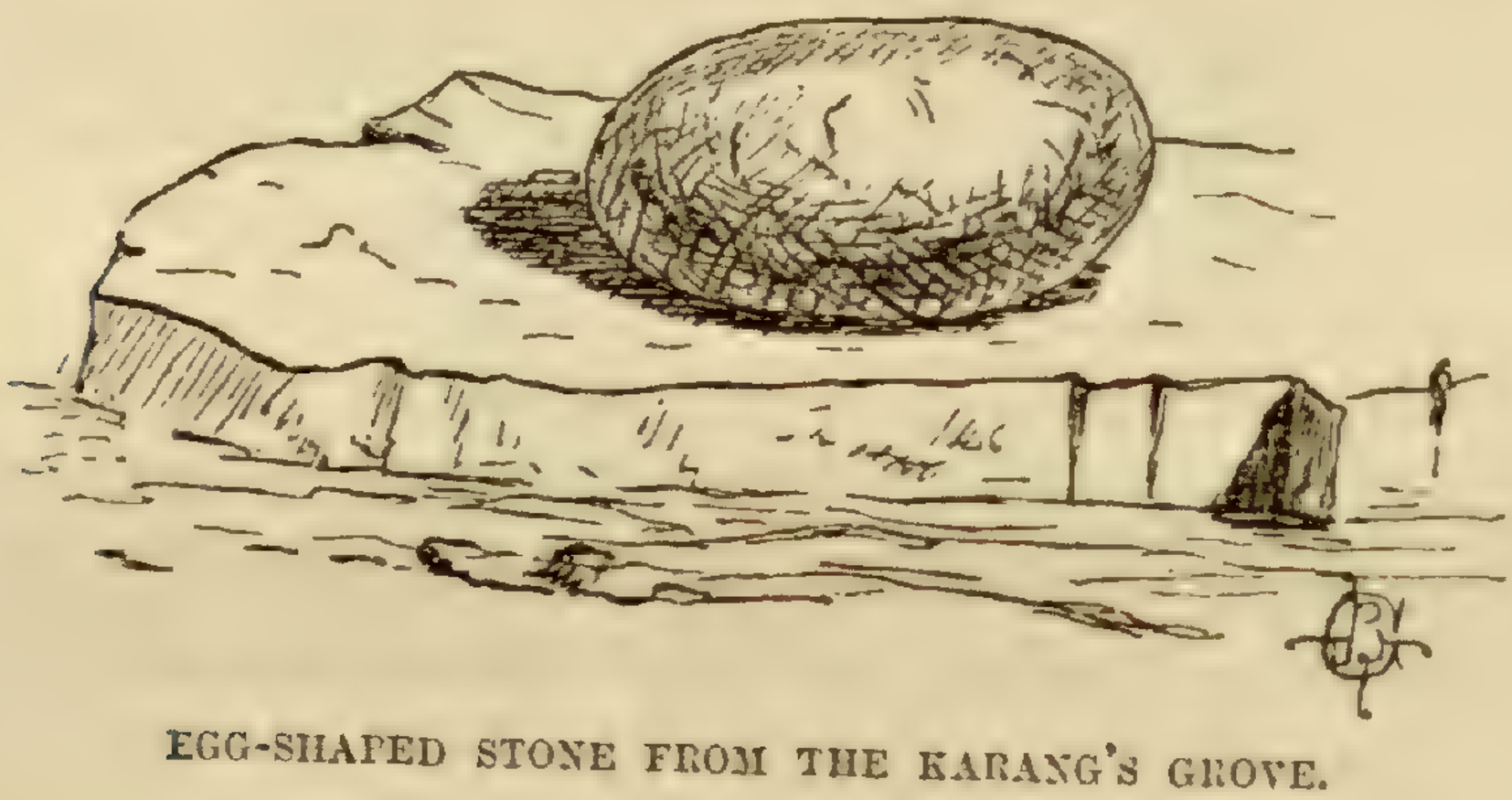
Under its shade there stand several mounds, blocks, and slabs which Mr. Lash conducted me one day to see. On entering the forest we were somewhat surprised to find a portion of the ground newly cleared of underwood from about several of the stones, and against them standing the remnants of small torches of sweet gums which had been offered before them. I felt certain that this was the work of none of the surrounding people who were afraid to enter the copse.

I decided therefore to make a full survey of the buried ruins, and after some difficulty I succeeded in securing, for a consideration, the services of a youth who was willing to

brave with me the wrath of the guardian spirits of the grove, and assist me in the sacrilegious work of hewing which my operations would entail.

In the immediate neighbourhood, was discovered a bronze bell of undoubted Hindoo manufacture, its handle ornamented with the sacred bull, but without the clapper which had dropped from its ring; and within the boundaries of the grove stands a rude figure of the Buddha, with elevated finger, as if in the act of instructing.

The ruins consist of terraces built up round the hill, which probably once encircled it entirely, but part of which has evidently extended where now the coffee plantation exists, and has been obliterated perhaps in the cultivation of forest patches by the natives in former periods. Only the portion surrounding for some distance that used by the worshippers has



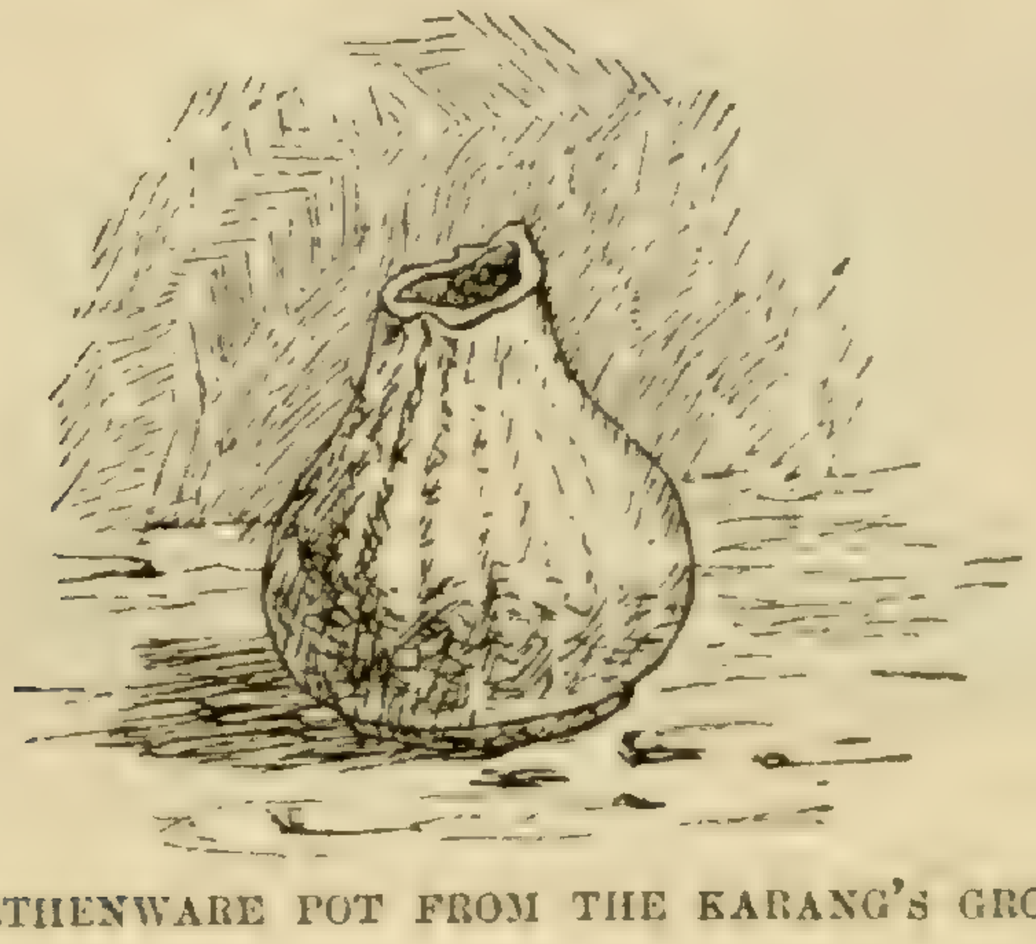
EGG-SHAPED STONE FROM THE KARANG'S GROVE.

been left unmolested. There the terraces are completely laid out in quadrilateral enclosures, their boundaries marked out by blocks of stone laid or fixed in the ground, which with singular exactitude lie within a degree of the true magnetic cardinal points. Here and there on the terraces are more prominent monuments—erect pillars surmounting oval piles of stones; flat slabs on the ground supporting egg-shaped blocks, which are distributed in many spots in such numbers and perfection of shape that to have made them or searched the brooks for them must have entailed a vast expenditure of time and trouble. Here and there also I found flat slabs raised on end and remains of circular paved areas, set round with upright blocks of stone. Specially noteworthy was a pillar, erect within a square marked out with stones on the ground, round

which the worshippers had plaited a fringe of Areng palm leaves. This same stone is thus decorated at every visit made by the worshippers to the sacred grove.

At the base of two of the stones, where perhaps they have lain for unknown time, I found an earthenware jar, both of them somewhat broken, but of elegant shape and artistic design, not of ordinary native pattern or workmanship; but, besides these jars, the egg-shaped stones and the image, all the monuments were of rough stone and without inscription or sign of handicraft. At the base of all the principal mounds and pillars I found remains of their offerings.

I learnt that the worshippers belonged to the tribe called the *Karangs* or *Kalangs*, who lived in a village lying several days' journey to the southward. Four times a year a proces-



EARTHENWARE POT FROM THE KARANG'S GROVE.

sion of old men and youths repairs, by paths known only to themselves, through the dense intervening forest in a direct course by valley and mountain, to this sacred grove; the old men to worship and make offering, the youths to see and learn the mysterious litany of their fathers. The old men lead the way; the rest follow in single file, no one breaking the silence of their journey. Should any one be encountered by them on the way their pilgrimage is considered for that time unpropitious, and they return to their village to wait for a more favourable occasion. On their arrival with early morning at the grove they camp in a small hut, cleanse the ground about the sacred mounds, and perform during the night or on the following day the rites known to themselves alone; in the evening they take their departure to an

adjoining valley, where below a great overhanging rock they wait till break of next day, when they return home in a similar secret and silent manner to their coming. They all wear garments of cloth striped with black and white.

Raffles* has given an interesting and full account of these people in his 'History of Java' from which I make the following extract: "They were at one time numerous in various parts of Java, leading a wandering life, practising religious rites different from those of the great body of the people, and avoiding intercourse with them, but most of them are now reduced to subjection, and are become stationary in their residence, having embraced the Mahomedan religion. In a few villages their peculiar customs are still preserved. Although by tra-

EARTHENWARE POT FROM THE KARANG'S GROVE.

dition their descent is from a princess of Mendang, Kamūlan, and a chief transformed into a dog, they have claims to be considered the actual descendants of the aborigines of the island. They are represented as having a great veneration for a red dog, one of which is generally kept by each family, which they will not permit to be struck or ill-used.† When a young man asks a girl in marriage he must prove descent

* For additional information the reader is referred to Tijdschrift v. Ned. Ind. i. jaarg. ii. deel, p. 295 *et seq.*: iv. j. ii. 217; vii. j. iv. 335 *et seq.*; Bijdragen v. Ind. T. L. en V.-Kunde, iii. Volgreeks, iv. deel.; Indisches Magazine, 1845.

† "According to the Zend Avesta, certain dogs have the power of protecting the departed spirits from the demons lying in wait for it on the perilous passage of the narrow bridge over the abyss of hell; and a dog is always led in funeral processions, and made to look at the corpse."—*Macmil. Mag.*, "Village Life in the Apennines," June 1879.

from their peculiar stock. When the Kalangs moved from one place to another, they were conveyed in carts, with two solid wheels with a revolving axle, drawn by two pairs of buffaloes, according to the circumstances of the party. In these were placed the materials of huts, implements of husbandry, &c. In this manner, until forty or fifty years ago, they were continually moving from one part of the island to another. They have still their separate chiefs, and preserve many of their customs. They are treated with contempt by their Sundanese neighbours, so that 'Kalang' is considered an epithet of contempt and disgrace."

Living despised and secluded in villages apart by themselves, they follow the rites and customs that have descended to them from their forefathers with the superstitious awe that comes of ignorance. The pillars in the centre of rudely circular heaps, as perhaps also the ovoid blocks resting on tablets and other shaped slabs, point no doubt to the celebration here of phallic rites and to the worship of the Linga and Yoni, the emblems of Siva and Vishnu. It is interesting to find the goblets or vases at the base of the upright pillars; they point probably to the "mystic vessels or goblets in the hands of Siva in the image of this god in Indian temples in central Java." Not less significant is the upright stone decked with palm-leaf fringe, a symbol round which these rude and ignorant villagers, following their blind traditions, weave to this day hangings, "just as the women did for the Ashera in the Jewish temple, and the Athenian maidens [following *their* old traditions] embroidered the sacred peplos for the ships presented to Athene at the Dionysiac festival" (Cox).

In standing under the forest amid these ancient remains, I felt as if I were having an unbroken view down the ages to distant antiquity; these relics still warm, as they were, with the intermittent fires which have been kept alive from the dim past till now, and echoing with the footsteps of the rude worshippers who, unaffected by the incessant waves of change that have broken about them, are themselves as much ancient monuments as the very blocks of weather-beaten, lichen-matted trachyte, whose purpose is lost to their traditions, before which they torpidly mutter a litany they do not comprehend

and listlessly perfume the air, they know not why, with the odours of their incense.

Not far distant from the Karang dwellings lies the sacred village of Tjibéo, inhabited by the Badui, containing never more nor fewer than forty souls. If their number be increased by birth the overplus must go out and reside in one or other of three neighbouring villages; if their number decrease the deficit must be made up from among the Outsiders, as they call these extraneous villagers. No foot but one of their own—not even of the highest European official—may cross the sacred boundary, which at some distance hedges the sanctity of their abodes. Like the Rodiyas of Ceylon, they eat carrion and the flesh of animals offensive to their neighbours; flesh of buffalo they may eat, but they may not kill the animal themselves, and of fowl also if the life have not been taken by the letting of its blood, but by a stroke on the head. They wear only a short loin-cloth, whose colour must never be other than white striped with black.* In speaking to any one not of their own stock, of however high a rank he be, they use the pronouns by which a superior distinctly indicates that he is addressing his inferior. At various periods of the year they also pay mysterious and religious rites to rude venerated blocks of stone, arranged in terraces near their village. The Kalangs are probably an offshoot of the same stock as the Badui, though they are not reckoned among those outsiders who may be received to make up a deficiency in the sacred Forty of Tjibéo, nor do they worship at their shrines. On the high Tengger Mountains, in the east of Java, a colony with rites and customs similar to those of the Badui exists in all the isolation and opprobrium that a schismatic religion can call out.

With the exception of the Karangs and the Badui, the entire population of Bantam profess the Mahomedan religion, which however seems to be merely a lusty and fanatical graft on the pagan superstitions of the ancient times.

* "A magnificent robe having been given to Gotama, his attendant Ananda, in order to destroy its intrinsic value, cut it into thirty pieces and sewed them together in four divisions, so that the robe resembled the patches of a rice-field, divided by embankments, and in conformity with this precedent the robe of every priest was similarly dissected and reunited."—Henry's 'Eastern Monachism,' chap. xii. p. 117. Can the striped garments of the Kalangs and Badui have any reference to the above tradition?

On Mount Dangka and on the summits of many of the neighbouring hills I stumbled on groves containing either rocks naturally *in situ*, or stones that had been placed there, which my porters refused to enter for fear of being affected by some sickness or misfortune. "They are Patapahäan" (places of penance and worship), they would say, and are the sacred spots where they believe their ancestors who, refusing to embrace Mahomedanism, fled to the forests, vanished in invisible forms. Whenever calamity overtakes them—when their crops have failed or they are childless—they repair (in greatest numbers during the month of the chief Mahomedan fast—Ramadan) to these *Tapa*, where they will spend days of fasting and awesome terror, in the hope that the spirits of their transfigured forefathers will grant them the desire of their hearts. In dire sickness, when the slender list of their pharmacopœia has been exhausted, they will as a last resource send to gather lichens from the sacred stones of the despised Kalangs or the Badui, in the belief that a decoction therefrom will avail to ward off or heal their sickness.

It is quite a common thing to encounter by the wayside near a village, or in a rice-field, or below the shade of a great dark tree, a little platform with an offering of rice and prepared fruits to keep disease and blight at a distance, and propitiate the spirits ever lying in wait in gloomy, sunless (and naturally depressing) spots to harm the passer by. This fear of lurking evil ever oppresses their lives. No one can be found brave enough to touch a man struck to the ground, for instance, by lightning; they will cover him up where he fell, with leaves or generally with stable dung, and commit his recovery to nature. If he recover, well and good; but to carry him from the spot, to lift him or meddle with him while unconscious, would be to cry down the Avenger's displeasure on their own head.

In the month of January 1880, Dr. Scheffer, the then Director of the Buitenzorg Gardens, wrote to me that, as much virgin forest was being felled among the mountains not far from the Government Cinchona Plantations in the adjoining province of the Preanger, a good opportunity offered itself of increasing my herbarium. This was not a chance to let slip, so, bidding a reluctant farewell to Kosala, I set off for Buitenzorg

by the direct foot-road through the forest. The only sound which disturbed the woods was the "Kang-kang-kong" of the "bird of the rainy season," as the native has named a species which disappears or is silent during the dry monsoon—a bird I could never catch a sight of, however, notwithstanding my most wary stalking.

CHAPTER III.

SOJOURN AT PENGELENGAN, IN THE PREANGER REGENCIES.

Leave Buitenzorg for the Preanger Regencies—Journey to Bandong in a Post-cart—Bandong—Thence to Pengelengan—Visit to the famous Cinchona Gardens of the Government—Plant-life in the surrounding mountains—The Upas tree—Crater flora—Land-slips and the power of rain—Interesting birds—The Badger-headed Mydaus—The Banteng, or wild cattle—Wild dogs—Leave Pengelengan for Batavia.

After a few days of preparation for my new tour spent in Buitenzorg, I sent off my baggage to the Preanger in the care of a string of coolies, and secured for myself a seat at the moderate rate of twenty cents per mile in the mail-cart which every evening leaves Buitenzorg for Bandong. The mail-cart was not the most luxurious, but it was the cheapest and certainly the most expeditious way of getting over the ground. This cart was a rough edition of our own mail-gig—simply a box on wheels—whose cushionless and slippery top formed a most uncomfortable seat, yet I would not have missed the ride for a good deal. We started with a couple of stout ponies yoked tandem-wise, and in place of side lamps our way was lighted by an immense torch made of splints of bamboo some seven feet long tied together, which a youth, who straddle-wise clung on behind, held to the wind to keep it ablaze.

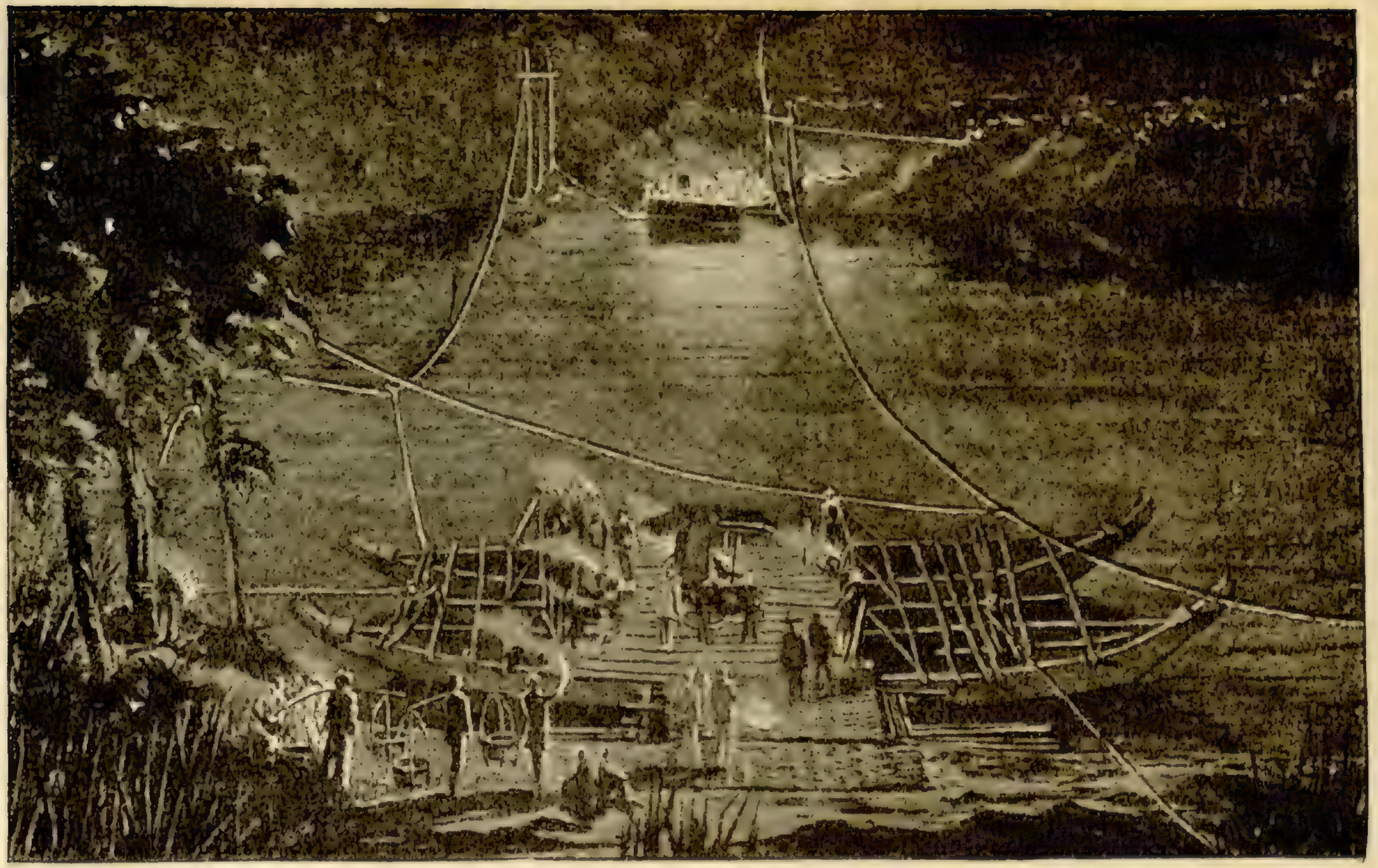
Our road lay over the Megamendoeng Pass, 4500 feet above the sea. At first the gradient was not very steep, and we proceeded at a fine pace. Towards every post-station, five miles apart all along the road, our progress was heralded by loud shouts, and by the louder shot-like whip-crackings that these drivers are famed for. At each station a halt of three or four minutes sufficed to put in the fresh horses standing ready for us, out blazed a fresh flaming torch, and our plunging and kicking steeds were off again, at a gallop which by voice and whip was not allowed to flag until we pulled up under the

next station. By and by the ascent became steeper, and our team had to be augmented by the addition of a buffalo in front of our horses; further up a second was added, till at last the equine was altogether discarded for the bovine element.

Under the soothing evenness of their progress I might have dropped into a pleasant doze; but the night was so beautiful that I preferred to enjoy the picturesque effect produced by the light of the torches on our team and their drivers—who were dressed in short red trousers, deep yellow jackets, and their tartan sarongs thrown sash-wise across their shoulders, and wore immense hats more than two feet in diameter; and to lose none of the charm of the bright starlit night and the fire-flies that illuminated with their fitful light the borders of the forest through which we were ascending whose low moan was the only sound that broke the stillness of the night, for the driver had coiled himself up as best he could, and was fast asleep, and the buffalo-boys walked like mutes at a funeral.

At about midnight we reached the summit of the pass, where it was so cold that I was glad to crouch by the fire of a small hut there, while the buffaloes were being changed. The place of the oxen was now taken by a single horse, which, urged at a pace more swift than safe, carried us down the mountain side into a warmer region in a very short time. The up-hill seat might have been more comfortable; but the down-hill ride was interspersed with practical lessons in dynamics which rather tended to disagree with the general quiet order of one's internal arrangements, yet the sensation of being whirled along at such a rapid speed was full of exhilaration and great pleasure. At 3 A.M. we pulled up at our half-way house—the post-office at Tjandjoor—where I was checked off with the rest of the baggage which had been consigned to the driver at Buitenzorg, re-booked for the remainder of the journey, and handed over to the charge of a new Jehu to be delivered at his destination.

Beyond Tjandjoor the road passed through a more level country, leading to the deep valley of the Tjitaroom. As there was no bridge over the ravine we were, on arriving at the near bank, assisted to alight by what seemed a regiment of walking torches, and with cart and horses transported on a bamboo raft to the further side, where two buffalo friends were



OUR NIGHT-CROSSING OF THE RIVER TJITARUM.

in waiting to haul us up the long steep bank out of the gorge, beyond which the road was easy, and the horses, urged to their utmost speed, dashed along through village after village, rousing the dogs and awakening the sleepers. The night growing into day brought us one of the pleasantest portions of our drive. The grey tints of the short dawn passing gradually through many lovely hues into a delicate blue, and the fresh wooded landscape lit up by the morning sun more charmingly than at any other hour of the day, are the beauties, never wearying to the eye, that accompany the opening of a tropical day. At 8 A.M. we drew rein at Bandong post-office, having accomplished somewhat over eighty miles in thirteen hours.

Bandong is the chief town of the Preanger Regencies, one of the largest and richest residencies in Java. In this province the Government has some of its most extensive coffee gardens, tobacco and cinchona plantations. The town is large and straggling, containing but few European houses; its most interesting building is the residence of the Regent or native governor of the district. In front of his door is a great square, in the centre of which a giant fig-tree grows, beneath whose shade on high days the natives congregate to sport and to pay respect to the chief. Though some 2000 feet above the sea it is hot and close at all seasons, and is not a very pleasant place to live in. The larger part of the trading population is Chinese and Arab, the natives taking little or no part in it; but the district is noted for its beautiful ornamental baskets of bamboo wicker-work.

Bandong stands in the centre of an immense level plain hemmed in on all sides by very high mountains—most of them volcanoes—which discharge their streams into it, whose waters can find only one outlet, the Tjitaroom, which issues from the western angle and flows northward into the Java Sea. In prehistoric times this plain must have been one large lake, till, by the convulsions and eruptions of the volcanic peaks that banked it in, a gap was formed, which drained off the water, and turned its bottom into a fruitful field. On the whole one would have preferred the lake, and Java could then have boasted of one respectable fresh-water sea, a feature of beauty conspicuously and unexpectedly absent from so mountainous and volcanic a country.

After resting a day in Bandong I proceeded to my destination, some thirty miles farther to the south. For fifteen miles of the way it was possible to drive in a spring cart, which I hired in the town; but the rest of the road, which rises to 4500 feet, is very steep, and had to be accomplished on horseback.

The road in the lower districts, shaded at short intervals by leafy Hibiscus trees, passed between hedges of bright yellow-purple- and red-flowering *Lantana*; higher up broad patches of pink balsam (*Impatiens*), shady *Albizzias*, purple Bintino (*Lagerstræmia*), tall tree-ferns and a shrubby species of *Cassia* bearing large trosses of bright golden flowers, were met with. A little higher a species of *Datura*, with broad leaves and large white trumpet-shaped flowers, suddenly became abundant. Being utilised by the natives as boundary hedges for their coffee-gardens, it formed by the size and abundance of its flowers a marked feature of the vegetation.

Five or six hours of slow ascent brought us at last to Pengelengan, a small village lying at an elevation of 4500 feet above the sea, on an undulating plateau formed by the inner slopes of the Malawar, Wayang and Tilu mountains, whose summits range from 6000 to 7500 feet, and at several points command a view of the South Indian Ocean. On the outskirts of the village was a comfortable and convenient Government bungalow, in which visitors to this rather out-of-the-way spot could, with the permission of the Resident (always willingly granted), be accommodated for a time. Here I was in the centre of one of the great Government coffee districts, and in the vicinity of its cinchona plantations on the slopes of the surrounding mountains.

One of my first visits was paid to the 'Bark' gardens in order to see in a living state these famous trees, and especially that species with cream-coloured flowers, the *Cinchona Ledgeriana*, which had attained so great a celebrity, and could in 1880 be seen, excepting in our Himalayan gardens, almost nowhere else but in the Dutch plantations. It is now little more than thirty years since the Netherlands Indian Government began to cultivate cinchona. Their first seed was brought by Haskarl, of the Botanical Gardens in Buitenzorg, who had been deputed by the then Colonial Minister to visit Peru to see the tree in its native forests and bring home

with him a collection of what seeds he could find. He was unfortunately very unsuccessful, and obtained seeds of only very inferior sorts. In 1866 the Government purchased, for less than £50, a small quantity of seed of a supposed variety of *C. calisaya* sent from America by Mr. Charles Ledger. So well had this species been propagated that there were nearly one million trees, worth more than a million and a half of money, in the gardens, raised from the seed then purchased.

It is well known that cinchona is so liable to hybridisation that it is very difficult to obtain pure seedlings from the seed even of pure trees, the offspring containing very often less alkaloids than their parents. An experiment, which has proved a great success, was made by Dr. Moens of grafting on the easily reared and quickly growing *C. succirubra* stems, shoots from the highest alkaloid-yielding trees. They have been found to grow very rapidly and to reproduce pretty regularly the same proportion of alkaloids as the trees from which the grafts were cut. Of Mr. Ledger's variety, now raised to the rank of a new species by Dr. Moens, the seed-raised trees may be of many degrees of value, but all contain a far higher percentage of quinine than any other species. I gathered as a memento of my visit some flowers from trees whose bark yielded, with a trace only of any other alkaloid, the extraordinary amount of ten and even thirteen per cent. of pure quinine. Continued cultivation has therefore, it would seem, vastly developed the amount of quinine that these *Ledgerianas* contain, compared with what they yield in their native forests of Bolivia.

The story of how the seed of this priceless tree (which can now be propagated *ad libitum*) reached the Old World is so interesting that I have extracted a few paragraphs from a letter of its introducer, Mr. Charles Ledger, in the *Field* of Feb. 5, 1881, addressed to his brother, evoked by an account of the Dutch Gardens I had contributed to the same journal in 1880:

"While engaged in my alpaca enterprise in 1856, a Bolivian Indian, Manuel Tuera Mamani, formerly and afterwards a cinchona bark-cutter, was accompanying me with two of his sons. He accompanied me in almost all my frequent journeys into the interior, and was very useful in examining the large quantities of cinchona bark and alpaca wool I was constantly

purchasing. He and his sons were very much attached to me, and I placed every confidence in them. Sitting round our camp-fire one evening, as was my custom after dinner, conversing on all sorts of topics, I mentioned what I had read as to Mr. Clement R. Markham's mission [in search of cinchona-seeds]. Now Manuel had been with me in three of my journeys into the cinchona districts of the Yungas of Bolivia, where I had to go looking after laggard contractors for delivery of bark. It was while conversing on the subject of Mr. Markham's journey, and wondering which route he would take, &c., that Manuel greatly surprised me by saying: 'The gentleman will not leave the Yungas in good health if he really obtains the *Rogo* plants and seeds.' Manuel was always very taciturn and reserved. I said nothing at the time, there being some thirty more of my Indians sitting round the large fire. The next day he reluctantly told me how every stranger on entering the Yungas was closely watched unobserved by himself; how several seed-collectors had their seed changed; how their germinating power was destroyed by their own guides, servants, &c. He also showed me how all the Indians most implicitly believe, if by plants or seed from the Yungas, the cinchonas are successfully propagated in other countries, all their own trees will perish. Such, I assure you, is their superstition. Although there are no laws prohibiting the cinchona seed or plants being taken out of the country, I have seen private instructions from the Prefect in La Paz, ordering strictest vigilance to prevent any person taking seed or plants out of the country. More than half-a-dozen times I have had my luggage, bedding, &c., searched when coming out of the valley of the Yungas. [Mr. Ledger unsuccessfully attempted to communicate with Mr. Markham, who was not permitted to enter Bolivia.] *

"You are aware how I am looked upon as a doctor by the Indians. Well, one day I said: 'Manuel, I may some day require some seed and flowers of the famous white flower, rogo cascarrilla, as a remedy; and I shall rely on your not deceiving me in the way you have told me.' He merely said, 'Patron, if *you* ever require such seed and flowers, I will not deceive *you*.' And I thought no more about it.

* *Cf.* Markham's 'Travels in Peru and India.'

"Manuel was never aware of my requiring seed and leaves for propagating purposes; he was always told they were wanted to make a special remedy for a special illness. For many years, since 1844, I had felt deeply interested in seeing Europe, and my own dear country in particular, free from being dependent on Peru or Bolivia for its supply of life-giving quinine. Remembering and relying on Manuel's promise to me in 1856, I resolved to do all in my power to obtain the very best cinchona seed produced in Bolivia.

"His son Santiago went to Australia with me in 1858. In 1861, the day before sending back to South America Santiago and other Indians who had accompanied me there as shepherds of the alpacas, I bought 200 Spanish dollars, and said to him: 'You will give these to your father. Tell him I count on his keeping his promise to get for me forty to fifty pounds of rogo cinchona (white flower) seed. He must get it from trees we had sat under together when trying to reach the Mamore river in 1851; to meet me at Tacna (Peru) by May 1863. If not bringing pure, ripe rogo seed, flowers and leaves, never to look for me again.'

"I arrived back in Tacna on the 5th of January, 1865. I at once sent a message to Manuel, informing him of my arrival. At the end of May he arrived with his precious seed. It is only now, some twenty-four years after poor Manuel promised not to deceive me, manifest how faithfully and loyally he kept his promise. I say *poor* Manuel, because, as you know, he lost his life while trying to get another supply of the same class of seed for me in 1872–3. You are aware too how later on I lost another old Indian friend, poor Poli, when bringing seed and flowers in 1877.

"I feel thoroughly convinced in my own mind that such astonishingly rich quinine-yielding trees as those in Java are not known to exist (in any quantity) in Bolivia. These wonderful trees are only to be found in the Caupolican district in eastern Yungas. The white flower is specially belonging to the cinchona 'rogo' of Apolo.

"You will call to mind, no doubt, the very great difficulties you had to get this wonderful 'seed' looked at, even; how a part was purchased by Mr. Money for account of our East Indian Government for £50 under condition of 10,000

germinating. Though 60,000 plants were successfully raised from it by the late Mr. M'Ivor, I only received the £50.

"The seed taken by the Netherlands Government cost it barely £50.

"Such then is the 'story' attaching to the now famous *Cinchona Ledgeriana*, the source of untold wealth to Java, Ceylon, and, I hope, to India and elsewhere. I am proud to see my 'dream' of close on forty years ago is realised; Europe is no longer dependent on Peru or Bolivia for its supply of life-giving quinine."

In my new locality I experienced, as at Kosala, the same difficulty in obtaining herbarium specimens of the great trees, with a better opportunity of verifying the fact that the bulk of those that had been felled were really barren. The fallen trunks, however, afforded an abundant harvest of ferns; while on the surrounding mountains, several of them quiescent volcanoes, which were higher than any I had yet visited, I was happy in gathering many shrubs and plants which I had not before seen. Close to my door grew one, our common rib-grass (*Plantago major*), which I would have passed by at home as a rank weed, but I gathered it here with real affection, as much "for auld acqua'ntance sake," as in sympathy with its distant exile and inexorable durance, with a few compatriots, on these unquiet peaks, which the hot surrounding plains have made an island-in-an-island prison, more hopeless to escape from than the most ocean-compassed speck. At 4500 feet above the sea I found a small species of *Hypericum* on wet ground, like our own Marsh St. John's-wort (*H. elodes*); here and there, about 5000 feet, appeared purple violets (*V. alata*), increasing in abundance with the ascent through woods of magnolias and chestnuts, their stems clothed with orchids, Freycinetias, climbing aroids and lycopods, and on whose floor the dreaded Upas dropped its fruits.

Beneath the shady canopy of this tall fig no native will, if he knows it, dare to rest, nor will he pass between its stem and the wind, so strong is his belief in its evil influence.

In the centre of a tea estate not far off from my encampment stood, because no one could be found daring enough to cut it down, an immense specimen, which had long been a nuisance to the proprietor on account of the lightning every now and then

striking off, to the damage of the shrubs below, large branches, which none of his servants could be induced to remove. One day, having been pitchforked together and burned, they were considered disposed of; but next morning the whole of his labourers in the adjacent village awoke, to their intense alarm, afflicted with a painful eruption, wherever their bodies were usually uncovered. It was then remembered that the smoke of the burning branches had been blown by the wind through the village; this undoubtedly accounted for the epidemic; but it did not allay their fears that they were all as good as dead men, for the potency of the sap as a poison is but too well known to them.

To prevent a general flight of the workmen it became necessary to get rid of the tree altogether, but the difficulty was to find any one willing to lay the axe to its root. At last a couple of Chinamen, after much persuasion and the offer of a high fee, agreed to perform the hazardous task of cutting up and carting it away. To the surprise of everybody they accomplished their task without experiencing the least harm. They pocketed their fee and departed in silence, without, however, saying that they had at intervals during their work, artfully smeared their bodies with cocoa-nut oil.

The sap of the bark alone is hurtful, for the logs into which the stripped trunk was cut were made into furniture for the owner's dining-room, without ill effects to the carpenters. The bark of another denizen of the same forest—*Gluta benghas*, one of the *Anacardiaceæ*—contains a sap even more noxious, for, falling on the skin, it produces stubborn ulcers which, on the woodcutters—who often get splashed on their arms and body—require months to heal; but its sap is not used by them for poison, as the *antiarin* is. It is curious to reflect how acute native ingenuity has been in elaborating a pharmacopœia abounding in subtle articles to waste or take away life, while it contains hardly one to preserve it. The action of some of these preparations, whose effects I had heard of as well as seen, astonished me vastly, but no bribe that I could offer was tempting enough to induce their old *dukuns* to disclose their composition.

At elevations of 5000 feet *Podocarpus* trees (of the yew family), oaks and laurels formed much of the shade, under

which flourished elegant *Melastomas*, with white instead of pink flowers, and raspberries (*Rubus*) of many kinds, the *Rubus lineatus*, a form with specially beautiful foliage, being abundant between 6000 and 7000 feet. On many of these mountains a single step would often lead the foot out of the green forest on to the edge of a great scar-like blotch, exuding sulphureous vapours through every crack and orifice, disfiguring their verdant slopes, like a suppurating sore on a fair neck. Yet within the indurated margins of these smouldering craters, a flora specially and surprisingly interesting is to be encountered. Amid the very vapours of the fumaroles I gathered bunches of Ericaceous flowers, such as *Gaultheria leucocarpa* and *punctata*, and *Vaccinium floribundum*, their leaves loaded with sulphur and other deposits, but their flowers stiff with healthy waxiness and fragrant with their own sweet honey odour; *Dipteris horsfieldi* and other ferns and plants, nowhere else to be seen on the mountain, grew in the steaming mud; while *Rhododendron retusum* stretched its roots out into the fuming streams, which boiled and bubbled over out of the rumbling cauldrons below.

The *Dipteris* fern is not found in Java much farther to the east. A line through the longitude of Samarang, which appears to be its eastern boundary, is also the western limit of the teak (*Tectona grandis*), of the camphor tree (*Dryobalanops camphora*), and of several species of palms (*Borassus flabelliformis*), and several species of *Caryota* and other trees, which are not found in West Java, though abundant in Sumatra. Mr. Wallace has pointed out how much he found the Ornithology of the eastern to differ from that of the western portion of the island; and among mammalia, I am told by intelligent natives, neither the rhinoceros nor the Badger-headed Mydaus crosses this boundary eastward.

Outside the rim of the craters, where the ground had begun as it were to heal, broad patches of a beautiful species of lichen (*Cladonia vulcanica*) covered the surface, each tip of its pale grey thallus crowned with a fructifying scarlet disk. This is the lowly vegetation with which Nature, when a crater has become extinct, first slowly hides the wounds her strife has made, while scars made by landslips are concealed in a single season with a luxuriant covering of bananas.

During the rainy season the thunder of slopes laden with forest trees and shrubs crashing down, often for hundreds of feet into the valleys, was a daily sound, which impressed me with the supreme potency of rain as an agent in planing down the mountains and widening the valleys. I have often been astonished at the rapidity with which even a small stream will carry away the *débris* of a great landslip. When a heavy gale accompanies continued rains, the fall of giant trees on the narrowed ridges of mountains, is very often the cause of extensive landslips into both the adjacent valleys, which lowers down by very perceptible degrees their barrier ridges.

Among the more interesting zoological objects of this district added to my collection, were the *Siphia banjumas*, a fairy fly-catcher of a beautiful azure blue, whose nest, a thing of beauty like itself, I found cunningly concealed and protected by the curled edges of a *Rubus* leaf and containing a delicate, pure white egg dotted over with brownish-red spots; a sea-green magpie (*Cissa thalassina*), with brown wings, coral beak and legs; and a handsome shrike (*Laniellus leucogrammicus*), known only from Java. Civet-cats were very abundant; and the nocturnal scaly anteater or pangolin (*Manis*) was pretty often captured in the evening, while clumsily climbing on the trees, licking up with amazing rapidity streams of ants, which are its sole food—an interesting form especially to the embryologist and the genealogist, who find in its structures surviving "marks of ancientness," which have greatly helped to unravel the mammalian pedigree.

Another slow prowler, the *Mydaus meliceps*, very often made my evening hours quite unbearable by the intensely offensive odour with which, even in its most inoffensive frame of mind, it hedged its crepuscular walks for at least a mile round. It was no use to try to frighten it away, for if its equanimity were disturbed it did not haste to his lair as one could have desired. It thickened, instead, the very air with a malignant scent that clung to one's garments, furniture and food for weeks. Horsfield has stated that it is exclusively confined to mountains rising over 7000 feet, "and that on these it occurs with the regularity of some plants extending from one end of the island to other on the numerous disconnected summits." Its altitudinal distribution is, however, not nearly so restricted as here

stated, for I have encountered it on hills and hot plateaus at all elevations down to below 500 feet above the sea; and it is said not to extend to East Java. The native has a superstition that if a man has fortitude enough to eat its flesh he will have become proof against sickness of all kinds.

In the forests on the southern slopes of the Malawar and the Wayang, the banteng (*Bos banteng*) lived in considerable herds. The full-grown animal has a magnificent head of horns, and I was very anxious to secure such a trophy; but only after the most wary and patient stalking was I able to get within range of a herd of them, and then only of a calf with immature horns. No more bellicose and dangerous inhabitant of the forest than a wounded bull need hunter care to encounter.

The baying of troops of *Adjags* or wild dogs often reached my ears, but in all my efforts to meet them in full hunt I was disappointed. The native accounts—repeated to me in Sumatra a year later, in identically the same terms—of their manner of hunting credits them with so much intelligence, if not reason, that I was anxious to witness the performance for myself. Their food is chiefly the *Kantjil* and the *Muntjac* deer, and the natives in both countries averred that, on discovering a patch of alang-alang grass in which these are hiding, the adjags first urinate all the grass in a circle round their fugitives, then drive them out, when, blinded and maddened by the pain of the pungent urine in their eyes, they fall an easy prey to the dogs. They are so exceedingly shy and wary that it is difficult to secure a shot, and I obtained only a single specimen in bad condition. As soon as the fact became known I had quite a crowd beseeching for shreds of its skin, or if not that for a few hairs or some portion of its body, to suspend or to burn with a form of words near their rice-fields, as a charm to keep off evil influences from the crop. The whole of the carcase was cut up by them, distributed, and carefully carried away for this purpose!

Such forms of words are implicitly believed in, as I had an opportunity one day of learning from a dealer in krisses, who came to my house to trade. He was very anxious for me to buy a blade, and carefully showed me how to select one that would not fail me in time of need. To be a trusty weapon for

me, it ought to be especially made to some measure of my own body—of hand, arm or thigh, of the breadth of my two thumbs or of my span; but to discover the same potency in a ready-made blade, I ought to divide a straw or a grass-stem, of equal length with the blade, into as many lengths as it contains of its own breadth at a distance from the hilt of twice the measure of the first joint of the thumb. These pieces laid on the blade alternately lengthwise and crosswise would reveal the suitability of the weapon for my use, by the direction of the last piece—crosswise it would indicate a fence—"a bar sinister"; lengthwise, no obstruction—a favourable omen. Another test was to measure its length by the breadth of my right and left thumbs alternately, repeating at each alternation one of the words, "*Sri, Lungu, Dunia, Rara, Pati, Sri,*" &c., and according to which of these words should fall to the last thumb-breadth would the blade be for me a wise choice or not. *Sri* being a designation of honour, and *Dunia*, signifying the world, would therefore be good omens; whereas *Rara*, meaning sickness, and *Pati*, death, would indicate misfortune, and the purchase of such a kriss would bring me disaster. In much the same way, I can recollect how as boys we used to augur our destiny by the number of buttons on our garments,—whether we were to become "a soldier, a sailor, a tinker, a tailor, a hangman, a lawyer or a thief."

In the beginning of May I left my bungalow on this salubrious plateau on my return to Buitenzorg. Everywhere the golden rice-fields were dotted with harvesters, their lacquered hats resplendent in blue and gold, the brown shoulders of the men and the scarlet calicoes of the women and children in the midst of the yellow grain, forming bright pictures in the sunny landscape all along the way.

After a few weeks in Buitenzorg and Batavia, spent in packing up and despatching my collections, I left for Telok-betong, in South Sumatra.

APPENDIX TO PART II.

I *Description of a new Bat from Java, of the genus Kerivoula.* By OLDFIELD THOMAS, F.Z.S., Assistant in the Zoological Department, British Museum.

[From the *Annals and Magazine of Natural History*, for June 1880.]

The specimen upon which this description is based was obtained by Mr. H. O. Forbes at Kosala, in Bantam, Java, 2100 feet above the sea, on the 24th of September, 1879, and is now in the British Museum.

KERIVOULA JAVANA.

Fur greyish-black, each hair being nearly black for its proximal third, then white for the middle third, the end being black, with sometimes a shining white tip. Ears rather short; laid forward they reach to about half-way between the eyes and the tip of the nose. Shape of ears and tragus exactly as in *K. jagori*, the former having the second small concavity in the middle of the outer edge, and the latter the deep horizontal notch above the external basal lobule described in that species, as shown in the wood-cut. Distribution of fur as in *K. papuensis*, there being short shining yellowish hairs thickly set along the forearm, on the thumb quite to the claw, all along the second finger, on both phalanges of the third, and on the digital phalanges of the fourth and fifth fingers. There are also a few hairs on the proximal end of the fifth metacarpal. The tail and the hind limbs quite to the bases of the claws are covered with similar hairs; the edge of the interfemoral, however, is without a fringe. The teeth are quite similar to those of *K. papuensis*.

HEAD OF K. JAVANA.

K. javana is thus intermediate between *K. jagori*, a Philippine species, and *K. papuensis*, from New Guinea, differing from the latter in the shape of the ears and tragus, and by the absence of an interfemoral fringe, and from the former by the presence of fur upon the limbs, that species having these quite naked. It differs from both, however, in the tricolor character of the fur, as they are of a nearly uniformly dark reddish brown colour, though the tips of the hairs are lighter.

Measurements of the type, an adult female in spirit: Length, head and body 1·93″, tail 1·72″, head 0·78″, ear 0·6″, tragus 0·37″, forearm 1·53″, thumb 0·27″, third finger 3·0″, fifth finger 2·2″, tibia 0·72″, foot 0·35″.

II. *On a new Genus of Spiders.* By Rev. O. P. Cambridge, M.A., C.M.Z.S., &c.

(Extracted from *The Proc. Zool. Soc.*, 1884, p. 196 *et seqq.*)

Mr. H. O. Forbes has lately described (*Proceedings of the Zoological Society*, 1883, p. 580,) under the provisional name of *Thomisus decipiens*, the habits of a spider which he met with in Java. The spider itself is remarkable from its exact resemblance to the droppings of a bird; and it is still more remarkable from the increased resemblance added in the spinning of a thin white web on the surface of a leaf, by means of which it secures itself, on its back, to the leaf, leaving its legs free to enclose and seize any insect unwittingly resting upon or crossing the apparantly innocuous bird-dropping. Mr. Forbes kindly sent me the spider for examination before writing an account of its habits. I immediately recognised its near affinity to an East-Indian spider (*Thomisus tuberosus*, Bl.), of which I possess the type specimen; but, unable at the moment to make a thorough examination and search through books and specimens, conjectured that it was allied to some spiders described by Dr. Karsch, and to one sent me some years ago from South Africa. A more complete examination since made has convinced me that these latter species (referred to by Mr. Forbes) belong to entirely different groups. I find, however, in my collection two other spiders, from Ceylon and Bombay, of the same genus and very closely allied in species, but quite distinct from that which Mr. Forbes notes. Upon these, together with the one last mentioned and *Thomisus tuberosus*,, Bl., I have ventured to found a new genus, and I beg to record my thanks to its discoverer for so kindly sending me an example of *Thomisus decipiens* and for having also made known to us the very peculiar and interesting habits belonging, not only to that spider, but also, I have little doubt, to other closely allied species.*

In his description of the habits of *T. decipiens*, Mr. Forbes expresses the difficulty he has in understanding the formation by the spider of a web which, while serving to attach itself to the leaf, at the same time so exactly represents the fluid portion of a bird's-dropping spread out on the leaf around the more solid parts; and his concluding sentences seem to me to imply the conclusion that the spider consciously supplements the effects of natural selection on its form and resemblance to the solid excreta, by spinning a web to resemble the fluid portion. It seems to me, on the contrary, that the whole is easily explained by the operation of natural selection, without suppo-ing consciousness in the spider in any part of the process. The web spun on the surface of the leaf is evidently, so far as the spider has any design or consciousness in the matter, spun simply to secure itself in the proper position to await and seize its prey. The silk, which by its fineness, whiteness, and close adhesion to the leaf causes it to resemble the more fluid parts of the excreta, would gradually attain those qualities by natural selection, just as the spider itself would gradually, and probably *pari passu*, become, under the influence of the same law, more and more like the solid portion.

* Doleschall ('Tweede Bijdrage tot de Kennis der Arachniden van den Indischen Archipel,' p. 58, pl. xi. figs. 9 and 9*a*) describes and figures, also from Java, a spider (*Thomisus dissimilis*, Dol.) possibly of this genus, and perhaps nearly allied to *T. decipiens*; but the description is too meagre and general to enable any certain conclusion to be drawn from it, and the figure given of the eyes is totally unlike.

Fam. Thomisidæ.—Ornithoscatoïdes.

Cephalothorax short, broad, as broad or broader than long, moderately convex above and slightly tuberculose; caput short, truncate in front, and strongly compressed on its lateral margins.

Eyes in two curved rows, the anterior shortest (the convexity of the curves directed forwards, and forming a crescent); small, not greatly differing in size, but the four laterals are largest, and the four centrals smallest; those of the lateral pairs are seated on or at the base of tuberculose eminences.

Falces strong, not very long, conical, and nearly vertical.

Maxillæ moderately long and strong, a little wider at the top than in the middle; rounded at the top on the outer side, and slightly leaning over the *labium*, which is about half the length of the maxillæ, and of a somewhat oblong form rounded at the apex.

Sternum oblong-oval.

Legs strong, moderately long, 1, 2, 4, 3; those of the first and second pairs much the strongest and longest, but nearly equal in length; those also of the third and fourth pairs are nearly of equal length and strength. All are somewhat roughened or tuberculose, especially those of the first two pairs, and furnished with spines of varied length and strength; those on the tibiæ and metatarsi of the two anterior pairs are strongest, the longest forming two parallel longitudinal rows beneath the joints. The legs terminate with two strong, curved, pectinated claws, beneath which is a small claw-tuft. Among the spines are one or two not very long, rather strong, of a pale colour or semi-diaphanous appearance, on the upper sides of the femora; these spines have a peculiar function as observed in one of the species, and may very possibly be of generic value, though spines of various sizes are found similarly situated in many other Thomisid genera, while their special function (if any) has not been yet observed, so far as I am aware, in other instances.

The *palpi* terminate with a single pectinated claw.

Abdomen broader behind than in front and truncated at both extremities; the upper surface and hinder part more or less thickly covered with round or subconical, shining, or other tubercular elevations. The spinners are short, stout, and closely grouped within a somewhat circular sheath-like cincture much resembling the disposition of those of many Epeirids.

Ornithosacatoïdes decipiens.

Thomisus decipiens, Forbes, *P. Z. S.* 1883, p. 586, pl. LI. Adult female, length rather above 6½ lines.

The general colour of this spider is a hoary or yellowish ashy grey marked with black. The abdomen has a large, somewhat quadrate black patch at the middle of its hinder extremity; on this patch are placed eight shining roundish dark-brown tubercles; the four largest form a transverse, unequally-sided parallelogram at the fore part of the black patch; the other four, which are much the smallest, form a longer transverse parallelogram immediately behind the other. At the hinder part also, on either side of the shining tubercles, are several strong tuberculiform eminences or prominences, of a similar kind to which are also four small ones in a transverse line at the extreme fore margin; some other depressed spots or pits are also disposed on the upper surface, with a dark blackish suffused patch at the middle of the anterior extremity, and another on each side just in front of the foremost lateral eminence.

The *cephalothorax* has a black irregular patch on each side of the hinder part of the thoracic region. The ocular region is somewhat suffused with blackish, and an irregular black, somewhat V-shaped marking indicates the junction of the caput and thorax. The two anterior pairs of legs have some black suffused markings on the upper side of the femora, the fore half (or rather more) of the tibiæ, the metatarsi, and tarsi of those two pairs being almost wholly black; while the two hinder pairs have only an irregular black marking here and there.

The spines on the tibiæ and metatarsi of the first and second pairs of legs are numerous, long, strong, and conspicuous.

The pale ones (mentioned above) on the upper sides of the femora are used, according to Mr. Forbes's observations, to secure the spider on its back to a patch of whitish silk spun upon the surface of a leaf. When so secured the spider has the exact appearance of the droppings of some bird, and the white silk patch emerging irregularly outside the spider has the appearance of the more liquid portion of the droppings flowing out and drying on the leaf.*

The *eyes* of each row respectively are equidistant from each other, but those of the fore-central pair form a shorter line than those of the hind-central pair. The four central eyes form a square whose anterior side is the shortest; and the height of the clypeus, which projects forwards, is nearly about equal to half that of the facial space.

The *legs* are, as described in the generic diagnosis, strong and minutely tuberculose, the tibiæ being of a peculiar bent form.

A single example was found by Mr. Forbes in W. Java, and at a later period a second on the Musi River, Sumatra

* Mr. Forbes has, since the above was printed, remarked to me that in the two instances which came under his notice, the resemblance extended even to the running down of the fluid excreta towards the lower side of the sloping leaf, ending in a kind of knob. Mr. Forbes also expressly disclaimed the idea of crediting the spider with any conscious design, but he says that "the similitude is so exact, that the spider might have had consciousness, and it could not have been more exact if the spider did have it." Is not its exactness probably the result of the unconsciousness of the spider? Conscious design would possibly have resulted in failure and abandoning the plan, or at least in a more clumsy imitation.

PART III.

IN SUMATRA.

SKETCH MAP OF SOUTH SUMATRA

shewing the Author's route

Route thus —•—

ENGLISH MILES

0 10 20 30 50

The boundary line of the Mountains on East & West is drawn where they attain an elevation of 600 feet; hills below that elevation are not indicated

The portion thus shaded ▭ *indicates alluvial lands.*

DJAMBI SULTANATE

Great Forest

INDIAN OCEAN

BANGKA STRAIT

MUNTOK

BANGKA

Pulu Rimau

Covered with Nipa Palms

PALEMBANG RESIDENCY

PALEMBANG

MUSI RIVER

Musi River

Lalang R.

Rawas R.

Surulangun

Bingin telok

Kelam

Sereka

Sekaru

Lakitan R.

Rupit R.

Ambang

Suka radja

Muara Rupit

Pulu kida

Peak of Karangnata

Bukit Indan

Mt. Seblat

Great Forest

Molo Maka

Ketahun R.

Lais

Beleran

Lumut

Tramas

Simut

Muara Eliti

Kepala Tjurup

Haba V.

Hot Springs

Tandjong Nyiur

TEBING TINGGI

Batu pantjah

Lampar

Talang Padang

Musi R.

Gunung Meraksa

Gumai Mts.

LAHAT

Darma

Muara Inim

BENCOOLEN

Pulu Tikus

Dempo V. 10,500

Pagar Alam

Palu

Bunding

Ruang P.

Luntar

Sumur Mts.

Pengan Loran

Batu radja

Gunung Kaung

Padjar bulan

Lubuk Ijau

MUARA DUA

Manna

Tallo

Camp

Banding Agong

L. RANAU

Tandjong bati

Besaei V.

Gunung V.

Hoodjoong Kenali

Kroë

Kotta bumi

Telok Benkunat

Semangka or Kaiser's Bay

Tabuan I.

Lagundi I.

Sebuku I.

Sebissi I.

Lampong Bay

Radja basa Mt.

Anjer

JAVA

SUNDA STR.

Krakatoa

L. Lebakdeling

L. Ayer tam

L. Lebak tapus

L. Luar

Lamasung R.

Tambangan R. River

Ogan R.

Komering R.

Kanan R.

Mangala

Trusan R.

Siputi R.

Lampongs

Tandjong Karang

TELOK BETONG

Tandjong Heran

Benegawang

Mt. Tengamus

Gunung Tiong

Pulang Bak

Sekamanong R.

Pedada R.

Tulang Bawang R.

Morass Lands

Java Sea

Longitude East from Greenwich

101 102 103 104 105 106

1 2 3 4 5 6

Harper & Brothers, New York.

CHAPTER I.

SOJOURN IN THE LAMPONGS—*continued.*

Leave Batavia for Telok-betong—Lampong Bay—Telok-betong—Leave for Gedong-tetahan—Forest scenery by the way—Escape from a tiger—Flowers in the forest—Gedong-tetahan—Birds and insects there—Move to Kotta-djawa—The village—Ruthless destruction of the forest—Trees—Entomological treasures—Move to Gunung Trang—The pepper trade—Birds there—Interesting butterflies.

EMBARKING at Batavia on the morning of the 18th of November, 1880, our course lay westward through the Thousand Islands into the Straits of Sunda, where, rounding the base of the Rajabasa volcano, we steamed up the Lampong Bay, between its scalloped shores girt by high hills—the southern fork of that unbroken chain which, commencing in the north of the island, runs down the western coast, and trifurcates before reaching the extremity of the island to form two bays, on the west Kaiser's Bay, and on the east Lampong Bay. As we steamed under the shade of these peaks, the sun went down tinging the crests on our left with gold, and those on our right with the richest purple.

Before we dropped anchor off the little town the full moon had come out; and one can scarcely say which was fairer, the sun-lit panorama of the day's sail, or the moon-lit landscape, with the pale, soft light on the hills, whose slopes guided the eye down to the white circle of the shore-line, on which the palm-trees, everywhere dotting its margin, had their crowns transformed into flashing plumes of silver.

Telok-betong is the chief town of the Lampong Residency, which forms the most southerly province of Sumatra. Besides the Resident and the chief administrative civil officers, the only other European inhabitants were the commandant, a couple of lieutenants, and a surgeon Dr. Machik, an enthusiastic ichthyologist and conchologist, in charge of a native gar-

rison of some 200 men. In addition to the true natives of the town, there was a large *campong* of Chinese, a few Arabs, with a considerable fluctuating population of traders from Borneo and Celebes, and other islands of the Archipelago. The Buginese or Celebes men are by far the most skilled navigators, and the greatest traders of them all; Macassar praus being famous throughout the Eastern seas for their voyages made without compass, yet rarely with mishap, from the eastern coasts of New Guinea to the Indian Ocean in the west, trading in their native-made cloths, in the lovely lories which they bring from east of their own shores, and in the native Macassar oil. The town was, therefore, before its destruction by the terrible earthquake wave of August 1883, inhabited by a rather heterogeneous collection of islanders; and, in consequence of each race building their domiciles according to the fashion in their own country, it was very irregular; but what it lost in this respect it gained in picturesqueness. It stood but little above the level of the sea, on a low narrow flat, which intervened between the shore and the very abruptly rising hills, on whose slope are situated the Government offices and some of the European residences, commanding a most lovely view of the bay.

One cannot examine a map of Sumatra without being struck by the singular disposition of the land. Along the whole length of the west coast is found, as already remarked, a long range of mountains with their outliers, while to the east of the Barisan, as this range is named, not a mountain, and scarcely even a hill, is to be seen. The entire eastern portion is one vast plain, of which immense tracts often lie at a time under water—the word Lampong signifies "bobbing on the water." One may travel in some parts in a straight line westward from the east coast for 150 or 200 miles without reaching an elevation of over 400 or 500 feet, while some 30 miles farther the Barisan peaks may ascend to over 10,000 feet.

After a short stay in the town, I started for Gedong-tetahan, some twenty miles north, provided by the Resident with a mandate to the chiefs of the various margas or districts through which my road lay, commanding them to render me every assistance. In Java the traveller has to look out for his own coolies, with whom he makes his own terms as to distance and remuneration, and finds no difficulty in so doing; but here, the

people being more lethargic, not a single individual would be got to volunteer to work, however tempting the hire, but for a Government enactment, then in force, that the chief of each village be responsible for the conveyance of the baggage of all officials and persons travelling under the authority of the Government from his own village to the next. Where villages lay close together, much time was lost by changing, and as within a considerable radius of the coast they dotted the wayside at every half mile or less, progress was distressingly slow and wearying to the temper as well as to the flesh; for, notwithstanding the order sent forward in advance, the coolies were never on the spot; one had gone to eat, another had gone in search of his knife, without which no one will stir, another had been taken sick *quite* suddenly, and such as were waiting were ready to swear that the baggage was twice the regulation weight—80 to 90 lbs.—and they would not touch it.

Before many of the houses which I passed were spread out drying in the sun large quantities of pepper, what I saw representing alone a sum of money sufficient to feed their whole families for nearly eighteen months. Were cockfighting and gaming not ingrained in them as a second nature, these people might amass great fortunes for their condition of life. Some do, indeed, hoard up considerable sums; but one had only to look on the children and young girls to see where a great deal of it went. Every girl is arrayed in sinkels or necklets, of various shapes of heavy silver, few or many, according to the wealth or position of her parents; on their arms rows and rows of bracelets, and in their ears large button-like earrings. These ornaments are the sign of a girl's maidenhood, and are worn till she marries. The wealth of a Lampong lady is thus estimated by the number and weight of her ornaments, which are, however, fully displayed only on feast days and high occasions. Most of these ornaments are made by native silver- or gold-smiths, and are purchased weight for weight in silver or gold as the case may be.

After the first few villages were passed, my road lay mostly between dense forest, extending for miles on both sides of the way. The trees were magnificent in shape and foliage—giant pillars, seventy and eighty feet without a branch, supporting superb leafy crowns under whose shade a thousand men might

bivouac, with trunk and limbs entwined and warped, often even to fatal strangulation, by an impossible unravelment of lianes and huge climbers, which hung in coils and loops, and stretched from tree to tree for hundreds of yards, themselves adorned as with finely curving scroll work, with ferns and orchids and delicate twining epiphytes. Beneath this shade a second forest grows of lesser trees, below which again a dense thicket of low shrubs and herbs, Caladiums, and broad-leaved *Scitamineæ* (or Ginger family) and of horrid thorn- and hook-bearing rattan-palms, climbing and holding on to everything, blocking up every unoccupied space—the whole forming an impenetrable wall of vegetation.

In this same portion of the road, a few weeks later, while returning from the coast, on horseback alone and unarmed, on a pitch dark night, I had a narrow escape from a tiger. My horse suddenly snorted in a strange manner, and came to a dead stop with its feet planted in the ground, then reared back; at the same moment the great body of a tiger shot close past my face and alighted with a heavy thud in the jungle on my other side. Haunted with the idea that I was perhaps being stalked, the night became doubly dismal to me. My horse, a miserable pony at best, was so terror-stricken as to be almost useless, and the seven miles that I traversed before the light of my own dwelling flashed on me seemed the longest I ever rode.

Mr. Wallace's truthful works have, or ought to have, now dispelled the erroneous ideas about the wonderful profusion of fine flowers existing in the tropics. This is just one of the products of "the summer of the world" that the traveller fails to see unless he search very well and very closely. The great forest trees are too high for one to be able to see whether they bear either fruit or flowers. It is only on rare occasions—and then the sight repays him for many a weary mile—that he alights on a grand specimen, whose top is a blaze of crimson or gold; more generally he knows that some high tree, which of many it is often very difficult to say, is performing its functions by seeing broken petals or fallen fruit spread over yards and yards of the ground. Of the great mass of lower vegetation nothing is seen but green foliage. Hours and hours, sometimes days even, I have traversed a forest-bounded road.

without seeing a blossom gay enough to attract admiration; far oftener I have stopped to pluck a gorgeous fruit. A vast amount of tropical vegetation has small inconspicuous flowers of a more or less green colour, so that when they do occur the eye fails to detect them readily. The fresh green, the rich pink, and even scarlet of the opening leaves are beautiful beyond description, and the autumn-tinted foliage never ceases through all the seasons, and with so much colour one is quite content to forget the absence of flowers.

On the passing traveller, therefore, the vegetation at the lower elevations leaves the impression of a tangled heterogeneous mass of foliage of every shape and shade mingled together in such unutterable confusion, that not one single plant stands out in anything like its own individuality on his mind.

Every now and then a curve of the road brought me on a colony of Siamang apes (*Siamanga syndactyla*), some of them hanging by one arm to a dead branch of a high-fruiting tree with eighty unobstructed feet between them and the ground, making the woods resound with their loud barking howls. The Siamang comes next in size to the Orang-utan, which is the largest of the great apes living in this part of the world, and which is found elsewhere only in the Malacca peninsula, the Orang-utan being confined to Sumatra and Borneo.

The Siamang is a very powerful animal when full grown, and has long jet-black glancing hair. In height it stands little over three feet three or four inches, but the stretch of its arms across the chest measures no less than five feet five to six inches, endowing it with a great power of rapid progression among the branches of the trees. Its singular cry is produced by its inflating, through a valve from the windpipe, a large sac extending to its lips and cheeks, situated below the skin of the throat, then suddenly expelling the enclosed air in greater or less jets, so as to produce the singular modulations of its voice.

Gedong-tetahan proved a very unfavourable hunting ground, as it was surrounded by unprofitable alang-alang fields. Nevertheless, I obtained some interesting birds. Among them I secured the crested bee-eater (*Nyctiornis amicta*), a beautiful creature with rose-coloured head and a throat of a rich shade of vermilion, which preferred the open

wayside trees to the dense forest shade; *Rhodolytes diardi*, one of the cuckoo family, with a light green bill, and velvet scarlet eye-wattle; and green and black barbets, whose peculiar and incessant cries filled the air.

In the open paths and sunny roads I netted scarlet *Pieridæ* (*Appias nero*), often flying in flocks of over a score, exactly matching in colour the fallen leaves, which it was amusing to observe how often they mistook for one of their own fellows at rest, and to watch the futile attentions of an amorous male towards such a leaf moving slightly in the wind. Among the *Pieridæ*, it has been said by Mr. Wallace that the male is as a rule more conspicuous than the female; but in this genus *Appias*—with the exception of a little more black in the female, the sexes of *Appias nero* are alike—the female is really, frequently, more conspicuously marked, and attracts the eye on the wing quite as readily as the male. Nearly all the species of *Callidryas* and *Catopsilia*, as Mr. Butler has pointed out to me in specimens in the British Museum, have the females more conspicuously marked than the males. *Hebomoia glaucippe* and its allies may be instanced, and the genera *Ganoris* and *Belenois*, as for example *B. eudoxia* and *B. theora*, in the latter of which only the female has the front wings orange.

From Gedong-tatahan I moved a little further west to Kotta-djawa. All along the way crowds of Buceros birds kept constantly flying overhead with their peculiar noisy scream and the breeze-like whirr of their wings, while from far in the woods came the softer koo-ow of the Argus pheasants, than which, among all the feathered tribes, scarcely any bird is lovelier. In Sumatra, the Argus occupies the place held in Java by the Peacock—a bird belonging to the same natural family—which seen in its native wildness is unsurpassed for brilliancy of colour and decorative appendages, but its ornamentation is too gaudy for long contemplation; while in the case of the Argus Pheasant one may admire feather by feather, and the same feather again and again, and daily see new beauties. The tail of the peacock is formed by a great development of what is technically known as the upper tail coverts, while that of the Argus pheasant is formed chiefly by an enormous elongation of the two tail quills and of the secondary wing feathers, no two of which are exactly the same; and the closer they are

VILLAGE OF KOTTA-DJAWA

examined, the greater is seen to be the extreme chasteness of their markings, and their rich, varied and harmonious colouring. When alarmed the Argus escapes by running through the thick underscrub, when the brilliancy of its plumage, by being gathered close about its body, is quite concealed.

Till I had observed it at a later period, I was not aware of its habit of making a large circus, some ten to twelve feet in diameter, in the forest, which it clears of every leaf and twig and branch, till the ground is perfectly swept and garnished. On the margin of this circus there is invariably a projecting branch or high-arched root, at a few feet elevation above the ground, on which the female bird takes its place, while in the ring the male--the male birds alone possess great decoration—shows off all its magnificence for the gratification and pleasure of his consort, and to exalt himself in her eyes. It is a strange fact that when the male bird has been caught—these birds are much trapped by the natives, their excessive shyness making it almost impossible to shoot them—the female invariably returns to the same circus with a new mate, even if two or three times in succession her lord should be caught. The female bird is rarely caught, owing to her flying to her roost when approaching the circus, while the great winged males walk into the ring, which the native skilfully barricades all round except the one spot where he sets his snare.

The houses in Kotta-djawa at first sight looked as if they were all roof and no body, for the broad thatched slopes and gables reached down to within five or six feet from the ground, where they projected out somewhat horizontally, so as to leave a free space all round the square bamboo or bark-made, box-like, propped-up edifice, in which, protected from sun and rain, most of the rice-stamping and other household operations were performed. In south Sumatra, though rivers abound, and there is much level land, the natives, till very recently, took always their rice crops from forest land, which produces a far less return of grain, of a quality, too, much inferior to sawah (or wet-field) grown corn. To make this *ladang* the native goes after the virgin forest, leaving his old fields to produce a new crop of trees, if the alang-alang grass does not get the upper hand.

The virgin woods contain the really interesting and valu-

able vegetation of the country; these trees being, to a great extent, the lineal descendants of the vegetation that has always existed on the island since it came into its present condition at least. Perhaps indeed some of the aged giants may have actually witnessed the young days of the present geological cycle. In the virgin forest death and decay are just as rapid as anywhere else; individual trees are constantly falling out of the ranks, but their place is taken by younger members either of the same or of neighbouring species. When, however, this ancient forest is devastated to any great extent, either by natural means or by the woodcutter's axe, the trees that arise belong to a different lineage, the new wood is in great bulk of different species, which, strange to say, were but rarely to be found in the old forest.

As in Java the original forest is rapidly disappearing; each year sees immense tracts felled for rice fields, more than is actually necessary, and also much wanton destruction by wilful fires. Trees of the rarest and finest timber are hewed, half burned, and then left to rot; amid their prostrate trunks a couple of harvests are reaped, then the ground is deserted, and soon fills up with the fast-growing and worthless woods, or falls a prey to the ineradicable alang-alang grass. Our children's children will search in vain in their travels for the old forest trees of which they have read in the books of their grandfathers; and to make their acquaintance, they will have to content themselves with what they can glean from the treasured specimens in various herbaria, which will then be the only remains of the extinct vegetable races.

In every clearing, trees, from their gigantic size, have here and there escaped the axe, and been allowed to stand unmolested. One cannot resist a feeling of pity for the solitude of these towering monarchs, whose grandeur, concealed as they stood amid the multitude of their peers, can now be seen in all their stateliness. They look the very picture of strength and immobility; yet, though they have withstood, in the company of their fellows, the storm and sun of centuries, they survive their solitude but a very few seasons, getting feebler year by year, one great limb after another dying and dropping off, till all life ceases, when some lightning flash or sudden blast measures their noble stems on the ground.

To obtain specimens of the ancient arboreal race was a task slow and difficult of accomplishment; for but few trees could be felled in one day, and good eyes were required to tell at a height of 150ft. or 200ft. if there were fruit or flower to reward the labour and time spent in the operation; and when, after hard toil, a great tree came crashing down, letting in the sunlight on the damp ground, the beauty of the foliage and of the flowers or fruit was often a rich recompense for the labour. It was a happy thing, that such a giant could not fail to bring to the ground portions of one or more of his neighbours in his downfall, large enough to afford grand specimens.

No one could fail to be attracted by the at first unusual sight of trees bearing their blossoms, or fruit, or both, in great profusion on their bare trunks. Of these the oftenest recurring belong to a group producing some of the most beautiful trees and shrubs in the world, the *Ternstræmaceæ*, or Tea-family, to which the Camellia belongs. The pendent pure white or pink-flushed, golden-centred corollas of the Saurayas, cluster round their trunks, hiding them for twenty or thirty feet of their height, like maypoles busked for a fête. Besides orchids and the *Asclepiadaceæ* which contain the wax-plants, or Hoyas, the brightest epiphytes were certainly the species of *Æschynanthes*, many of which have drooping bell-flowers of the deepest scarlet.

Zoological prizes had just as diligently to be searched for as botanical trophies; as in the case of flowers, insects, birds and other animals do not wait, even in the profuse tropics, at every blossom, or on every branch for the collector's net and the hunter's gun. In the depths of the virgin forest little life is to be seen; there, an oppressive silence reigns. One hears occasionally only a distant note from some bird or mammal, or the stridulating of a cicad on a tree trunk far out of eye-shot, and in the second growth, if these are more abundant as the ear asserts, they are as difficult, from numerous obstacles to sight and progress, to see or secure. The ornithologist and the entomologist obtain most of their treasures in the small virgin forest patches in the neighbourhood of villages, in wide shady paths in the great forest, and along sunny walks amid the opened portions of the second growth.

I was fortunate in finding a little of all this description of

country at Kotta-djawa. My favourite resort was the sunny pathways, bordered by second growth forest of some size, where many attractive Mussændas, euphorbiaceous trees and shrubs, and thick clumps of the aromatic and brightly varie-gated *Lantana*, were always in flower.

The *Lantana* was one of the greatest favourites of most kinds of insects; beetles, bees, and butterflies were always present by scores; and I observed that they visited the different coloured florets quite indiscriminately. Of the last the swallow-tailed species—*Papilio brama, theseus, arycles, arjuna*, and a lovely black-and-white species which is known as *Papilio saturnus* —were specially abundant, but difficult to secure, as they were greatly persecuted by all the other species feeding on it—the *Pieridæ* and the dragon-flies being their worst enemies. They constantly sailed round and round in a timid way, as if watching for an opportunity to swoop in, but were often so driven off that for half an hour at a time I have seen them unable to make one successful visit. The beautiful tailed *Loxuras* and *Aphnæus* were also in abundance, while *Hypolymnas anomala* frequented the thick jungle, floating out at intervals into the open. "This species offers the most remarkable case known among butterflies of a reversal of the usual sexual colouring, the male being always dull brown and the female glossed with rich blue . . . The brilliant blue gloss causes the female to resemble or mimic *Euplæa midamus*" (Wallace). Mr. Butler has shown me in the British Museum, however, males with nearly as much blue as the females. It is singular that no male of this species is yet known from Java. Specimens in the British Museum, named by Mr. Wallace as males of *Anomala*, are not from Java. Undoubted males from Malacca and Borneo have broad patches of blue towards the border of the front wings. The female *Anomala* from Java has more blue than the specimens of the same sex from Borneo, and it is not improbable that the Java male may have more blue than the Bornean. What appears to be a female, named *Hypolymnas wallaceana* by Mr. Butler from 'India,' corresponds with the male *H. anomala* (of Wallace's description) in the British Museum from Borneo. The Euplæa which these species mimic is common to Indo-Malasia.

From Kotta-djawa I moved further westward to Gunung-

Trang, the chief centre of the pepper and dammar trade, where there was more high land and virgin forest. From this village alone in the height of the pepper season more than fifty pony loads go every week to the coast, each carrying $1\frac{3}{4}$ piculs, or 219 Amsterdam pounds weight. It is rare that single loads are sent down to the coast, generally a small troop goes together, and the village square presents rather an exciting scene in the early morning of a despatch of cargo. The strong but wofully skinny creatures have, like their masters, little relish for hard work, and conduct themselves in the most refractory manner possible—objecting first of all to be caught, then resenting with teeth and limbs the impost of pack-saddle and bags. When, however, the last cord has been adjusted, after many imprecations and Allah-il-Allahs from the pack-master, they give in to the inevitable with perfect grace, marching off as docilely as possible generally behind a belled leader, and thereafter require little or no attention.

The price obtained for this amount of pepper at the coast amounts to about £118, no mean amount per week (during the season) for a small village, whose only outlay consists in the cost of food and the Government tax of one guilder per head. It takes seven or eight years for a new pepper garden to reach maturity, but when it is in full bearing, each shrub will yield as much as 10*s.* 8*d.* worth of fruit in a season.

The other great industry of the place is dammar collecting. This substance, as is well known, is the resin which exudes from notches made in various species of coniferous and dipterocarpous trees. Some of these, especially of the latter family, are immense giants, out of whose stem—which often reaches 100 feet before branching—the native cuts large notches, at intervals of a few feet, up to a height of some forty or fifty feet from the ground. The tree is then left for three or four months, when, if it be a very healthy one, sufficient dammar will have exuded to make it worth collecting; the yield may then be as much as ninety-four Amsterdam pounds. Most trees, however, exude a far less quantity and require a longer time.

The damar attam (from the *Hopea dryobalanoides* and other *Dipterocarpeæ*, and not from the *Dammara* (*Coniferæ*)), a beautiful clear glass-like substance—the "eye dammar," as the

native name signifies—is the most prized, and fetches about two guineas for 125 Amsterdam pounds. The greater part of this goes to the European market, to be made into varnishes principally, and is purchased at the coast by the Chinese traders, who in turn carry it to Batavia and Singapore to resell it. A much inferior sort called "stone-dammar" got from *Vatica eximia*, also one of the *Dipterocarpeæ*, is worth about 2*s.* 6*d.* only per 125 Amsterdam pounds, and is purchased at the coast by the Bugis from Celebes and the Bawean men from near Borneo, to be used by the native prau-builders to fill up seams and leaks. The thick, close, tough bark of the tree, however, is a much more valuable commodity, for, as it can be stripped off in immense sheets, it is greatly used instead of planks or the more open bamboo wickerwork, as sides for their houses, and is an excellent substitute.

The native distinguishes his pepper shrubs and his dammar trees from all other sorts by the expressive title of *pohone wang*, or money trees. The pepper (calamitously, he holds,) does not grow wild in the forest in any way suitable to his desire, but must be planted and tended. The dammar requires no such care; and as he roams the forest, to his eager eye no tree, shrub, or herb has the slightest interest if it is not an unclaimed *pohone wang*. He has not sufficient interest in those who are to come after him two generations hence—just as his forefathers before him had none—to plant a dammar-yielding arboretum; he prefers to spend days in hunting the forest in their quest.

When he has fallen on such a prize—now to be found only in the dense forest far from any dwelling-place—he at once proceeds to clear off from under it the surrounding vegetation, and to make several deep hacks or distinctive marks as the sign of appropriation. It is then safe; for it is in their code of honour to respect such a tree, not from any high moral principle, but from the more interested reason—lest, if to-day he robs his neighbour's dammar, he himself, who may to-morrow be the lucky finder of perhaps several richer trees, may in like manner be robbed. There exists also the inherited superstitious dread of some unknown evil to follow; for perchance the finder has hedged his property by the sanctity of a spell, the violation of which, will, sooner or

later, it is believed, be followed by the visitation of a sētan in the form of a sickness or misfortune. If a sētan be supposed to reside in any spot, not an individual will be found brave enough to approach it, however great profit might accrue to the venturer.

In these forests I added to my collection some of the fairest of the feathered tribes—orange and scarlet-crested woodpeckers, green barbets, blue and bronze doves, green and scarlet twittering *Loriculi;* and on dead snags of the lonely outliers large hawks and falcons. Of mammalian animals my most interesting capture was the *Sciuropterus*, a flying squirrel with large gentle lemur-like eyes, soft fur, and black margined parachute expansions.

The neighbourhood of this village I found to be an excellent locality for butterflies; for there were abundance of paths among second-growth forests, many open clumps of flowering shrubs, and hot sandy and pebbly banks along a broad and shallow stream unobstructed by bushes, sunny corners, and shady nooks innumerable. Almost every walk I took is indelibly and most delightfully memorable by the finding of some gay or remarkable form. Especially numerous were those interesting species, which have the gift of the slippers of invisibility to rescue them in dangerous moments. Frequenting the dense thickets they would flit out into more open spots, displaying for a few seconds the rich brilliancy of the cobalt of the upper sides of their wings, then settling either on a dry leaf, or more commonly on the ground among fallen foliage and twigs, whose colour, exactly matching their closed wings, concealed them beyond power of detection. Of these I obtained *Amathusia amethystus*, *Calites epiminthia*, *C. eupty-chioides* and *Eurytela castelnaui.*

Few butterflies can compare with another of my captures here, the *Amblypodia eumolpus*, the upper sides of whose wings are of the most sparkling emerald. A less brilliant but very chaste species of *Cyrestes* (*C. periander*) fell also to my lot only after great difficulty, for it loves the dense thickets, flitting with short flights from the under side of one leaf to the under side of another, where, spreading itself flat out, it disappears and is not easy to find. If with my hunters I sat down for a rest in an open sunny spot after a hot chase, we

were often the centre of attraction for quite a flock of a very beautiful large butterfly, *Euplœa ochsenheimeri*, which would fearlessly rest on their naked bodies and on my sweating hands, whence they allowed themselves to be captured between the fingers in the easiest manner possible. Another butterfly also, the *Cynthia juliana*, was often caught at the sweating bodies of the natives.

CHAPTER II.

SOJOURN IN THE LAMPONGS—*continued.*

Move towards the Tengamus Mountain—Butterflies found on the journey thither—Tiohmomon—The Balai, a characteristic institution—Descent of the Lampongers—Their Language—Divisions of the province—Titles and dignities—Ornaments—Festivities and amusements—Marriage customs—Move to Penanggungan—Petroleum and paraffin matches—Penanggungan—Great trees—Interesting plants and animals—The Siamang—Move to Terratas—Ascent of the Tengamus Mountain—Its flora and fauna—Return to Penanggungan and to Batavia.

In the middle of August I moved my camp north-westwards to the village of Penanggungan towards the high peak of the Tengamus at the top of the Semangka Bay. I followed a native forest path, reported to be good, but which turned out to be an execrable tunnel through a grove of low rattan-palms, whose delicate but unbreakable tendrils, hanging down on all sides, studded with the sharpest and most unrelenting hooks, were ever suddenly fetching me up by a lasso round my neck or body from which no amount of ill-natured tugging or pulling would avail to relieve me, and from whose thorny grapnels I could release myself only by yielding, and stepping calmly backwards. Here an immense tree-trunk, six or seven feet in diameter, lay athwart the path; there a gigantic mud bath, the wallowing hole of a herd of elephants, in which my porters sank to the waist and sometimes to the armpits.

On the way I netted a large Ornithoptera (*O. amphrysus*), and the first known female of *Amesia jurenis*, a day-flying moth which mimics *Trepsichrois mulciber*, while by the margin of a small stream I caught *Leptocircus virescens*, which derives protection from mimicking the habits and the appearance of a dragon-fly, in a crowd of which it is often to be found. In form it reminded me of the European genus *Nemoptera*. It flits over the top of the water fluttering its tails, jerking up and down just as dragon-flies do when flicking the water with the

tip of their abdomens. When it settles on the ground, it is difficult to see, as it vibrates in constant motion its tail and wings, so that a mere haze, as it were, exists where it rests.

Emerging from this forest, I found myself in Tiohmomon, a typical Lampong village, in a district which had been inhabited for many generations. The houses were all substantially built of planks, with, in many cases, carved decorations on the cross beams, and painted designs on the intermediate panels.

The Balai is the most—we might almost say the only—peculiar and characteristic institution of the Lampongers. It is always the largest and most prominent edifice in the village, situated apart from all others, and in the most central position. It stands eight or ten feet from the ground, on massive pillars formed of great tree-stems, and is built generally of planks of wood, or of bamboo wicker-work. It is evident that much labour has been bestowed on it, for, as a rule, it indicates the highest available workmanship, as it is the result of the combined labour of the whole community. It is lofty, and roofed either with thatch of grass or rattan-palm leaves, or covered with wood or bamboo "slates," according to the fashion of roofing in vogue in the village. It is fairly well lighted, but the light, as a rule, is admitted only by the latticed gables, and by long slits and small windows a few feet above the level of the floor, more suitable, of course, to the squatting native than to a European sitting on a chair. Two doors, reached by strong bamboo ladders, or well-made wooden stairs, and situated one at each end of the building, either in the gables or in the sides, afford ingress and egress. At one end within a small inclosure is a cooking place—a deep layer of earth on which the fire rests.

The Balai is in reality the town-hall of the Lamponger. It is the common property of every man, woman, and child in the village. In Mahomedan lands a man's house is sacred; for a man rarely enters the dwelling of his neighbour, and never without the head of the house; but the Balai is the assembly-room—the meeting place for all. Its doors stand ever open. All business is transacted under its roof; all *bitjaras* (consultations and discussions) are held there. At whatever hour one enters, its most characteristic occupants, lazy, sleeping

villagers, are to be seen dotted over its floor. During the day, the *orang-jaga*, or watchman, who occupies an open guard-room during the night, makes the Balai his watch-tower. All travellers passing through the village are free to its shade and shelter. The *orang-bedagang*, or itinerant pedlar, finds at once a free lodging, a market-place for his goods, and an eager crowd to listen to the news he brings. Here all civic feasts and festive gatherings are held. Here they enjoy the pleasures of the dance for unbroken days and nights together. This being truthfully explained, means that the seated youths behold with delighted eyes the peculiar and monotonous posture figures, supposed to be elegant and most bewitching, of the ornament-bedizened maidens performing two and two at a time to the clanging and clamour of gong and drum, and that the maidens in their turn have the privilege of gazing on their future lords going through the same performance. Under its roof, their love is consummated in the wedding and attendant ceremonies. Here, before a crowded audience, they are invested with their equivalent knighthoods and peerages; and here, in many villages, they are at last laid out, and pass from it to the grave. Around the Balai, therefore, centres, as it were, the whole life of a Lampong village.

The Lampongers claim to be descended from the Malays of Menangkabau (a district in the Padang region of Sumatra's West coast), where it is believed the first conquerors of the island established their kingdom, whence they spread to the northern central portion, and thence along the west and southern coasts, of what is now the Lampong Residency, at first, slowly by families and small communities, which agglomerated into separate *margas* with their chiefs.

The dialect spoken in the Lampongs "appears to be an original tongue, with one-third of its words of unknown origin."* I am doubtful how far this will be borne out by its closer study. It contains a very large number of corrupted Malay and Sundanese words; but the written symbols are peculiar to Sumatra. In Java, where Malay (met with in the coast towns), Sundanese (spoken only in the west of Java and supposed to be a distinct language), and Javanese are the spoken languages, Arabic is employed for expressing

* Stanford's Compendium of Geography, *Australasia*, Appendix.

in writing both Malay and Sundanese, and the beautiful, interesting well-known Javan symbols for its own language. The Lampong characters have no resemblance to either of them, but Mr. Keane holds that they are based on the Devanâgari, as he affirms the Javanese to be also. The letters of which a specimen is given on the opposite page are mostly either horizontal lines, or lines meeting each other at acute angles, with marks and dots above and below the line, to form nineteen characters, representing the sounds ka, ga, gna, pa, ba, ma, ta, da, na, tya, dya, nya, ya, a, la, ra, sa, wa, cha (rough). Marks and hooks above and below the letters are used to indicate the vowel sounds and the addition of *n* and *ng*, and a sign to indicate the dropping of the final vocable, so as to express the consonant, as "Ka *tanda mat*" ("dead sign") indicates K. At first, with only a native teacher, scarcely half of whose discourse I could comprehend, the acquisition of the language seemed very difficult; but, having the key given, it was far easier to acquire than it looked.

The margas are the old native districts (one might almost call them regencies) into which the country was originally divided, each owning its own independence. The Government, in parcelling out the country for administrative purposes, has retained as much as possible the boundaries of the marga intact, as each had often its own peculiar customs, to which the people adhere with hereditary tenacity. In the old days each marga, and possibly each kampong (village) had a copy of its *oondang-oondang*, or laws, written on bamboo-stems, or on lontar (*Borassus*) palm leaves, which were preserved as heirlooms from generation to generation, till eaten up by a small boring beetle—which can in a very short time reduce the stoutest bamboo to powder if it is not looked after—or till destroyed in the fires by which every village has been periodically wiped out, when it would be reinscribed from the memory of some old villager, and again transmitted. In very rare cases only would the bamboo record be applied to, for in every village there was always some one, as now, who knew its contents with perfect accuracy, to whom it had been taught when a child by his father, as he in like manner had been taught by his; so that when a case arose in which the *adat* (custom) was in question, recourse would be had to the living repository, as

LAMPONG CHARACTERS: AN ILLUSTRATED PAGE FROM A NATIVE-WRITTEN ROMANCE.

the quickest means of settling the point; for their reading, like their act of inscribing, was, even as now, a painfully slow and difficult affair to the most learned. Now-a-days these interesting relics are very rare, and almost impossible to procure.

Each marga, as a rule, has in it several villages, each with a chief. Each village community is a collection of families, either related or not to each other by the ties of blood—consisting of the original family or nucleus of the village and those descended from it, and of the companies of immigrants who have come from different places, and at different times, with their descendants. Each of these companies, or families, was called a *suku*, and each selected one of their number to represent them in all matters affecting their interests. So then a village community consisted, and still more or less completely consists, of several *sukus*, each with its head, all subject to the village chief, who would, in the first instance, be the representative of the first *suku* or nucleus of the village, and thereafter, if that representative left no heirs, the person on whom the choice of the *sukus* might fall. A trivial cause of dispute in a *suku* would be brought before the chief of the *suku*, associated with some of its old men from whom an appeal might lie to the head of the village with one or more of the *Kapala sukus*. A case in which more than one *suku* was concerned would come before the village chief, sitting with the uninterested *Kapala sukus*. An appeal from this village court might be made to the chief of the marga, possibly along with the village chiefs of the marga, beyond which, of course, it could not in past days go. This court also exercised jurisdiction in cases of inter-village disputes. A marga was therefore a little independent principality, or rather clan, whose boundaries were the limits claimed by the first immigrants to the place; and seems to have been at first ruled by him among the settlers who was most influential or of the closest blood relationship with the chiefs or princes of Menangkabau giving them the right to the title of *Penyimbang*.

The highest Penyimbang within the boundaries ruled over the marga; then in each village the highest ranked was chief of the village, and the next after him became chiefs of the village sections. The Penyimbang need not of necessity become chief of this village or marga; he could delegate his authority to

another, but still his voice, in all matters where he chose to exercise it, had pre-eminence. The Penyimbangs constituted a hereditary nobility, which exercised great influence; and if I have understood the narratives of those old chiefs with whom I have talked, they were nearly all of equal rank. No one could be raised *de novo* to the honour of a Penyimbang without the consent of all the Penyimbangs in his marga. When this was obtained he was called out, by the Marga chief, amid the acclamations of the people convened in full assembly in the Balai of the capital of the marga, before whom the services entitling him to the honour and showing him to be a "fit and proper" person to be so endued were proclaimed, to take his place on the raised benches occupied by the nobility. The new peer was then bound to kill in honour of the occasion, a number of buffaloes, according to the degree of his rank, sometimes as many as ninety, and give a great feast, as well as bestow a present on each of his brother Penyimbangs.

As margas increased in number, so their boundaries became eternal subjects of dispute, referred as a rule to the arbitrament of war. Now, as the Sunda Strait alone separated the south eastern extremity of Sumatra from Bantam (which, until abolished by the Dutch Government in 1811, was a flourishing kingdom under powerful Sultans), a rich trade in rice, pepper, and pottery, at length sprang up between the Bantamese traders and the Lampongers. Whether the former introduced the cultivation of pepper into the Lampongs, or found these settlers already acquainted with the culture, is doubtful; but it is certain that at an early date rich spice gardens flourished in southern Sumatra. Every year the Sultan sent across a fine prau laden with all sorts of earthenware, an art then unknown to the Lampongers, with a letter full of compliments and good wishes, which was publicly read on a day when all the Penyimbangs had assembled, to which they returned a complimentary reply with gifts of pepper and elephants' tusks; so trade gradually increased, and with it the power and influence of the Sultan, whose aid in these intermargal disputes, either by mediation or more practically, was often besought. Grateful chiefs sent in return rich presents of ivory and pepper, with acknowledgments of his influence, till gradually the Sultan's protection was

extended over the greater part of the Lampongs in return for a yearly tribute. Special services were acknowledged by the bestowal of titles and dignities. These honours and ranks were hereditary, and were at first conferred directly by the Sultan; but afterwards they could be purchased, with the assent of the other peers of the marga, from a hereditary Right-holder, by such as were of faultless "name and fame." A *pangkat*, or title, was just as dear to the heart of a Lamponger as now to his European brother, and assiduously did he labour to hoard up the necessary sum, and cultivate by presents the good will of the Penyimbangs, in order that he might some day have the pride of occupying one of the seats of honour at marriage feasts and on gala days, almost the only occasions on which the happy possessor of a *pangkat* could be distinguished from his fellows.

The Order of the *Pepadon* was the highest conferred by the Sultan. The Pepadon was a great wooden chair, with a high back richly carved, and stood in the Balai. The honour consisted in occupying this seat at feasts and high occasions before the assembled marga, while the Penyimbangs of lesser rank occupied lower seats to right and left. On grand days the Pepadon was often overlaid with gold and silver plates, lent for the occasion by the people of the marga. On his first installation to the Order the new noble was drawn on a wooden car from his house to the Balai, and if he were of old family it was shaded by a yellow or white canopy.

If within a marga a person be found murdered, and the murderer cannot be discovered, the whole marga must pay to the relatives a sum of money according to his rank, as an expiation. On this account all travellers are saluted with, "Where to, master?" and "Where from, master?" "Where did you spend last night?" that there may be some clue as to his whereabouts should he go a-missing; and of the people among whom he was last seen alive, in order, if possible, to saddle some village with the crime.

The Order of the Pepadon gave the possessor and his relatives the right, if murdered, to a higher sum of blood-money than any one else. Not only this; for his daughters he could demand a sum (*djudjur*) from the man claiming her hand four times as great as from a man who had no rank.

The next lower rank consisted in the privilege of sitting in the Balai on state occasions against a wooden pillar, called the *Sesako*. It entitled the relatives of its possessor to a sum of blood-money less only than could be demanded by those of members of the Order of the Pepadon, and a like proportionate djudjur for his daughter's hand. Should he be afterwards elevated to the rank of the Pepadon, the Sesako was nailed to the back of the Pepadon.

The *Lawang Koree*, or "honour-door," the third rank, was a gateway of carved wood or stone which was erected near to the dwelling of the holder.

On women of ancient family and of high rank certain honours were also bestowed. They were entitled to be borne to the Balai on great occasions on a state car; but the right to be carried with the foot resting on the body of a man as a footstool belonged to the most high-born alone. Women of less distinguished birth could come walking on variously adorned mats spread before them by their slaves.

In a full assembly of the marga on a high occasion, the foremost places are occupied by the Penyimbangs of various orders. In a line fronting the Penyimbangs sit all the *budjangs*, or unmarried youths, facing a row of young maidens. The sight is a gay one. All are in their best attire, the general crowd in whatever garments please their fancy most, but generally of the gayest colours of coats and headcloths, and sarongs suspended by large silver- and gold-buckled belts, with ivory- and gold-handled krisses stuck in the waist; the women—for those that stand round have all been married—more sombrely, wearing the matrimonial symbol, the *sulung*, a necklet of massive gold or silver rings strung immovably, except for a little piece in front, on a cylinder of the same metal, and the thick stud-like earrings, the only ornaments that their severe laws permit to those who have known the bonds of wedlock. Here and there among the crowd a crownless boat-shaped hat, made of cardboard, and bound round with a gold plate, indicates that its wearer is a childless wife. The young unmarried men are simply attired in a sarong of a bright colour, supported by a belt fastened by a buckle of greater or less value according to his rank, with the corresponding number of krisses stuck in it,

and with a headcloth tied about his temples in the fashion of his district; but from the waist upwards naked.

The centre of attraction is the long line of maidenhood, glittering in silver and gold of native workmanship. The hair of each girl, neatly arranged and odoriferous from abundance of cocoa-nut and cajeput oil, is tied in a knot behind and transfixed by a high-backed comb overlaid with gold plates; her head is crowned with a coronet (*siggar*) of gold, of form and magnificence according to her pangkat; a shawl worn sash-wise hangs from the shoulder to the ground, while from above the middle hangs a rich sarong, or petticoat, of home-grown and spun silk, interwoven with gold thread, and decorated with hundreds of small coins of the Dutch mint, which jingle pleasingly as she dances. Above this the body is girt with a silk *slendang*, half concealing the breasts. The arms, shoulders, and chest are bare, except for the numerous gold or silver collars and necklets and bracelets, of patterns peculiar to her marga, with which she is loaded. Often these collars are entirely composed of the large dollar pieces of Spain, Holland, and Mexico, and of English half-crowns. Of the highest-born maidens, the arms from the wrist to the elbow are almost concealed by the display of pure "barbaric gold," for they may wear as many bracelets as they choose; while their sisters less fortunate in the matter of blood and rank must conform to the regulation number corresponding to their degree. The breast is overlaid with crescent-shaped gold plates, suspended in tiers; the waist is encircled by a belt of one of the precious metals secured by an elaborately-carved buckle of the same material. The rather bony fingers are encircled with many rings, and even the nails are lengthened by additions of silver into talon-like claws; so that altogether the Lampong maiden presents a dazzling appearance in the dim uncertain light of a lamplit Balai. The cost of such a costume represents no mean sum; it is not uncommon for a girl to have as much as £100 worth of ornaments about her person at a festival.

When all is ready, the ever monotonous music commences, and the Master of the Ceremonies, whose place is between the two lines, at a signal from the chief calls—and his directions must be implicitly obeyed—on two of the maidens to dance.

His office is both a delicate and a difficult one. He must himself be of good position in the community, and be more or less a general favourite; but especially must he be intimately acquainted with the social position and rank of all present; for should he unwittingly call on two maidens or two youths of different ranks to dance together he will have committed a mistake which has many a time turned the festival into a fight, for the parents or the relatives of the higher-ranked of the dancers, feeling themselves insulted, have suddenly revenged themselves by amok—that mode of retribution which is to them the swiftest and most gratifying; the first victim being generally the unfortunate Master of the Ceremonies himself.

The daughter of a low Penyimbang used to have the right to have one girl attendant behind her, with a young man to hold a white umbrella over her head; but a maiden of the highest rank was entitled to as many as six attendants, and to be shaded by a silk umbrella, gaily ornamented with flowers and gold-leaf, which, when she was not dancing, lay folded in front of her, by the side of a cushion on which her rank entitled her to place her fans. The daughters of villagers without pangkat danced in the best they could afford, but unattended and unshaded.

The high-born youth was distinguished by the number and gorgeousness of his krisses, and further by the number of youths prostrate on the ground before him, on whom he placed his foot as a sign of his authority. These customs have now been greatly modified, as the attendants on the high born were in former days their slaves (and slavery has been for many years abolished by the Government), and where they now appear they are paid servants, or relatives or friends who have volunteered to take for the occasion the place of the slaves of former days.

White was the sign of nobility, which alone those of high pangkat could use, all others being obliged to wear cloth of a dark colour. Blue remains even now when all restrictions have been removed by law, the commonest colour of garments worn by the people; but even yet the sight of white in one of low rank incites envy or enmity. The Magistrate of one of the districts informed me of a case he had shortly had before him, in which the complainant had the white umbrella he was

carrying snatched from him and broken before his face. The accused pleaded, an excuse which he thought sufficient, that his neighbour had no right to an umbrella of that colour, as he was a man of no pangkat. Even in their houses, till recent times, only chiefs had the right to sleep on a mattress, or have it protected by curtains, every one else being obliged to sleep on a mat laid on the floor.

The performers called on by the Master of the Ceremonies come forward and seating themselves in the open space, perform towards the chiefs and the assembled company with graceful respect the *sembah*, a form of obeisance made by placing the hands together and bringing them to the forehead at the moment of inclining the head. Each maiden has a fan in both hands, which she holds by fixing them before and behind alternate fingers, and the performance, which consists in posturing the arms and hands, and but little in the movement of the feet which really scarcely stir out of the spot, can hardly be denominated dancing. The various attitudes assumed are few and not very elegant, and, after being repeated to all sides, they are ended by the *danseuse* gradually sinking down to the sitting position, *sembahing* to the company, and resuming her seat among her fellows, when her place is taken by any two youths whom the Ceremony-Master may call on, who go through much the same performance in a less elegant manner. Intervals in the dancing are filled up by the singing of love songs by the young men, which are responded to by the maidens, often in extempore verses, which are generally scratched with needles on pieces of bamboo, and passed to their sweethearts through the hands of the Master of the Ceremonies to be preserved by them as valuable keepsakes. Such festivals mostly last through a whole night; but on great occasions often for several days and nights together.

When the festival lasts several days the forenoons are given up to feasting, the early afternoons to sleep and talk, and during the latter part the youth engage in the middle of the village square in a game of ball called "simpak," in which they vie with each other before the maidens, as well as the general public—who congregate in the shade of the eaves of the surrounding houses as spectators and admirers—in the display of the proficiency and elegance of their movements.

The game consists in the young men, who dispose themselves in circles of as many as twenty, keeping in the air a large hollow sphere, made of rattan cords neatly twisted together, by kicking it only with the side of the foot as it descends—touching with any other part of the body being out of rule. In dealing the kick, the limb is swung out with great vigour almost perpendicularly, while the body is thrown back nearly to the horizontal position, and the beauty of the play consists, besides keeping the ball continually in the air from player to player, in the elegant leap with which the body is brought back to the erect posture without the player changing his foot-ground; and the more elegant these movements—and really very elegant they are—the greater favour and applause the player wins among his female spectators.

On tiring of this, various couples engage in a species of dance—the relic of a war dance—full of spirited action, and of a character quite different from that to which the nights are devoted.

When in the small hours of the morning the *finale* of such a festival takes place, the maidens are escorted home by the young men, who flank their wards, each bearing a great flaming torch, which now reflected in the water of some wide stream which must be crossed, now blinking through the trees of some forest-skirted path produces a most pleasing effect as the various parties wend their different ways from the village.

Their homegoings end—in what land do they not?—in the old tale. He who has long spent his evenings by the rice block—a large heavy log of wood, with a conical hole in it, in which the rice corns are husked by being stamped by a long pole—admiring, as well as assisting, the maiden of his choice in her work, (which displays more than any other employment the grace and beauty of the female figure,) is at length rewarded. The sign of engagement is often a ring, but more generally the youth and the maiden exchange some portion of their garments.

As a rule the engagement is kept secret from the parents ill near the time when the youth desires to marry. When he goes to the parents of the girl his real difficulties begin. A daughter is so much property, and cannot be lightly allowed to leave her father's roof without fetching an equiva-

lent. The Government has now enacted that all marriages shall be without let or consideration, between "him who will with her who will," but the system of *djudjur* (or price to be paid for a wife), sanctified by generations of custom, it is almost impossible to prevent, as when a fair sum is not paid, the girl's father can always raise insurmountable difficulties, so that, in fact, the *djudjur* is almost invariably paid, and is in amount according to the status of the youth, and of the parents of the bride. When this has been (*sub rosa*, of course) satisfactorily arranged, the parents of the youth and of the girl must appear before the chief of the village (if they belong to the same village, or to both chiefs if the parties belong to different villages) to give official information that their children wish to marry. This is the *katrangan* (*trang*, is clear) of the affair; it is, in fact, the publication of the banns. After this has taken place, it is legal for the parents to receive a small fixed gift (marriage gold, as it is called), but any demand for a greater sum is penal.

The system of *djudjur* has acted, and still acts, very detrimentally on the population, for, as a rule, the sum demanded by a father for his daughter's hand is so great that many young men cannot afford to marry; and as children born out of wedlock are from of old considered to be a stigma on the village, the people have increased but little in number. Of course if a youth should complain to the magistrate that he cannot marry the girl of his choice on account of the large sum demanded by her father, the magistrate would at once interfere; but it is very rare that any complaint is made, the youth preferring to pay the *djudjur*, beaten down to the lowest figure possible.

If, however, the youth chooses he may marry the girl in the manner known as "ambil anak" (literally, "taking a child"), in which case the father of the girl receives the husband into his house as one of his children, bound to labour in her place, for him absolutely.

In effect, by this form of marriage, the husband becomes the slave of his wife; he is bound to do all that she may demand, and, should he rue his bargain and obtain a divorce, the children of the union remain with her, and he goes out as he came into the house—portionless. It always remains open to him, however, should he fall heir to any property, to pay the

djudjur and remove his wife to a home of his own. If a man have a larger family of daughters than of sons, it is very customary for the eldest son to bring a wife to his father's house, but for the rest of the sons to go to the houses of their mothers-in-law, and for the daughters either to bring their husbands to their mother's house also, in order that her parents may reap the benefit of their labour, or to migrate to their husbands' homes. Where a man's only child is a daughter, marriage is almost always by "ambil anak."

With the richer members of the community it is a matter of pride to pay *djudjur* for their wives. When no agreement can be come to about the *djudjur* between the youth and the parents of the girl, the two often elope together to the man's village (if they belong to different villages, or to another village if they be of the same village), in which she is placed in the house of his father, but, if she is of higher rank than himself, in the house of the head of the village. The father of the girl pursues with an armed following, and, being met at the entrance of the village by a like force, a fight (nowadays a sham fight) takes place in front of the Balai, in which the father of the maiden allows himself to be overcome, whereupon an adjournment is made within the building, and matters are amicably settled, the day ending with football, dancing, cock-fighting, and festivities. Their marriage ceremony follows the Mahomedan rites.

From Tiohmomon I continued my way to Penanggungun. I was greatly surprised to see, even in the smallest villages, the universal use of two articles of western civilisation—petroleum oil and paraffin matches. There was scarcely a dwelling in a village of even eight to ten houses in this out-of-the-way corner of the world in which this oil was not the illuminating medium; if there was not in the house another article of western origin, there was a lamp, often of a most elegant and costly pattern, of gilt brass, and complete with wheel and pulley apparatus. I daily saw packhorses laden with De Voe's well-known boxes passing through the villages to more distant places. Nearly every native, too, produces from a fold of his cotton kilt, or his head-cloth, when he wants "fire," one of the little yellow-papered chip boxes, with "Patent paraffinerade säkerhets tändstikor

utan svafvel och fosfor," which arrive in these parts from Sweden—if not also from the "fabriks" of swindling Chinamen in Singapore—by the hundred thousand.

There is scarcely a western article but the Chinamen have introduced its counterfeit here, sometimes with such wonderful ingenuity that, even when anathematising them, one cannot help feeling a sort of respect for their perseverance and assiduity even in evil doing. This broad dissemination of tänd-stickors has driven into oblivion the savage's picturesque friction block. He strikes his match on the box and lights his cigarette at the flame, guarding it from wind between his half-closed hands, as if he were a native of the Isles of the Blest. Though one is certainly pleased enough to have those commodities ready to one's hand, yet it is decidedly disappointing not to be able to outrun civilisation; one would fain see "some new thing," some strange artifice or curious custom. To the ethnographical student, the latest Paris designs in the furniture of a Polynesian or New Guinean hut must be extremely interesting and edifying!

Penanggungan was quite an embryo village in the middle of a fresh clearing in a piece of very ancient forest, and consequently a rich botanical hunting-ground. In its near vicinity grew one of the grandest *Urostigma* trees I have ever seen; its broad buttresses and sturdy supporters, among which a wanderer might almost lose himself, looking like the pillars of some ancient Moorish temple. It was thick in fruit, and harboured legions of skipping squirrels, great apes, and troops of monkeys, which, to the eye surveying them from below, looked like pigmies flitting about amid its branches. Immense flocks of the large fruit-pigeons, and of the smaller members of that numerous and beautiful family, crowded to this rendezvous, their wings keeping up a constant whirring in the air by their coming and going; scores of the great hornbill (*Buceros galeatus*) with their five-feet expanse of wing, and myriads of smaller birds whose varied calls and notes alone indicated their presence, flocked from far and near to this inexhaustible storehouse (and its produce could not be less than tens of thousands of bushels of figs), and yet the vast assemblage but sparsely peopled this single magnificent specimen of the vegetable kingdom.

Here also I gathered a splendid orchid (*Galeola* sp.) growing on damp rotting tree-trunks, climbing over the low forest, singular in producing no foliage but putting forth a stem profusely flowering at short nodes for forty feet in length, with blossoms of a rich yellow colour. In the depths of the forest I found the large *Raffiesia arnoldi* and *Hasseltii*, and the smaller but handsomer *Brugmansia Lowii*.

On the giant *Urostigma* I shot several specimens of *Bucerotidæ*, the white-crested *Hydrocisa albirostris*, and the great hornbill (*Buceros galeatus*), whose heavy scarlet hammer-fronted casque, which it uses to beat with far-resounding thuds the branches of the trees, draws upon it a severe persecution, as in Palembang each head commands a large price, for out of its dense white ivory-like consolidated horn, are manufactured studs and sleeve-links of great beauty. The casque in most species of this family is a cancellated structure permeated by blood-vessels so teased out as to give it great lightness, that it is difficult to understand why in this species it should be so solid and heavy; yet, notwithstanding, no bird could flit about more lightly in the tree-tops, or gather its food more agilely. In a longitudinal section of the head and casque of this bird, the thick horny hammering portion, as well seen in the figure opposite, has behind it a layer of dense bone to which osseous bars radiate towards the occipital condyle, where the head joins with the neck, and pass above and around the brain cavity, to protect it in a most beautiful way from shock. The brain cavity is thus lodged below the line of shock, and is besides separated from the casque by padding in the shape of a cartilaginous joint. To Professor Flower I am indebted for directing my attention to the beautiful section in the Museum of the Royal College of Surgeons sketched here, whose structure had indeed led him to infer, before he knew the fact, that the bird must use its head as a hammering instrument.

In a neighbouring stream, flitting from stone to stone, I obtained the lively *Hydrocichla ignicapillus*, a bird in habit and colour closely resembling the true wagtails; and on its banks the horned frogs (*Megalophrys nasuta*) were abundant, whose anvil-like clinking "kang-kang" filled the air in the evenings; but, in simulating so closely the dead leaves among

which they lay, it required the closest search to find them. Lying flat on the ground, their sharp acute horns mimicked the points of leaves, from which lines radiated representing crossing and overlapping margins, while dark-brown spots and

HEAD OF BUCEROS, AND SECTION OF ITS CRANIUM.

markings distributed over their bodies could not be told from the blotches and fungoid growths of decaying vegetation. *In coitu* the male embraces the female round the lumbar region.

On shooting a Siamang in our high *Crostigma* preserve, my hunter found, on picking it up, a young one clasped in

its embrace, to all appearance dead also. Both of them he brought home slung on a pole. Cutting their thongs, he threw them down on the verandah and went off again. Being very busy, I had taken no notice of them till a movement caused me to look up, when I saw the young ape quietly making tracks for the stairway; but I quickly secured him, despite his screams and vigorous attempts to bite. It had been only stunned by a pellet on the head, and had no bones broken. In a very short time it tamed down and became a most delightful companion. Its expression of countenance was most intelligent, and at times almost human; but in captivity it often wore a sad and dejected aspect, which quite disappeared in its excited moods. With what elegance and gentleness it used to take what was offered it with its delicate taper fingers, which, like its head, are more anthropoid (except for their hairiness) than any other ape's! It would never put its lips to a vessel to drink, but invariably lifted the water to its mouth by dipping in its half-closed hand and awkwardly licking the drops from its knuckles. The gentle and caressing way in which it would clasp me round the neck with its long arms, laying its head on my chest, uttering a satisfied crooning sound, was most engaging. Every evening it used to make with me a tour round the village square, with its hand on my arm, enjoying the walk apparently as much as I did. It was a most curious and ludicrous sight to see it erect on its somewhat bandy legs, hurrying along in the most frantic haste, as if to keep its head from outrunning its feet, with its long free arm see-sawing in a most odd way over his head to balance itself.

That they can leap the great distances from tree to tree ascribed to them is, I think, incorrect; for during the felling of the forest near the village, when a little colony of Siamangs got cut off from the branches of the nearest trees by some thirty feet only, they scampered up and down the tree howling in the most abject terror at every stroke of the axe, yet without venturing to leap the intervening space, and even when it was falling they did not attempt to save themselves by springing to the ground, but perished in the crash of the tree. The Siamang and the Ongka (*Hyalobates variegatus*), an allied but smaller ape, are the most interesting

of the Quadramana to be met with in this region, the Orang-utan not being found so far in the south.

Continuing my journey, skirting round an elbow of Mt. Tengamus, I descended on the village of Terratas, looking down on the Bay of Semangka with its mountainous shores, and on the peaked summit of the island of Tabuang standing out of the motionless water. In one of the little ravines I gathered specimens of a singular climbing shrub (*Lagenaria*) with immense semi-globular fruits over two feet seven inches in circumference. Though in size so large they are quite light, their seeds being small and winged with a broad glancing membrane, thinner than the finest white tissue paper, which serves as a float to disseminate them.

Two days later I made the ascent of the mountain, which, owing to its fissured and chasmed character, was tedious and difficult. Passing through a dense belt of wild bananas and Zingiberiaceous plants, then a zone of disagreeable rattan-palms, we broke into the deep, dark virgin forest, beneath whose shade little or nothing was to be found growing, save here and there an arum with a curious serpent-head-like spathe, or in bright scarlet fruit; but at 3000 feet I was gladdened by entering a belt of Ixora trees in one mass of scarlet flowers, which, as the mountain rose abruptly, had a fine effect viewed from above. In the damper regions a little higher, the tree-trunks began to be more densely clothed with orchids and ferns and climbers of all kinds; and here and there, high in the angles of the branches, scarlet Azaleas, which had crept down the mountain out of the temperate heights as far as they might dare. At 5000 feet I gathered Horsfield's Dipteris fern, which seems too delicate to thrive well at home though it is a denizen of the higher mountains of the tropics, accompanied by great fields of a handsome species of bracken (*Gleichenia glauca*). At 5400 feet I halted for the night in a small hut that I had a day or two previously had erected for our accommodation on the verge of the more temperate region of the mountain, where the trees became smaller and more stunted and were loaded with lichens, mosses and feathery lycopods, and which turned out to be the lowest limit of the pitcher-plants.

Few signs of animal life were observed, except the spoor of

the tapir, and high up the wallowing holes of the rhinoceros, and footprints of the rare mountain antelope (*Antilocarpa sumatrana*); the intermittent low booming note of the large fruit-pigeons (*Carpophaga badia*) answering each other at roost, and the chattering cries of flocks of Babblers (*Garrulax palliatus*) at play in the distant tree-tops, filled the woods, but they never approached near enough to afford a chance of securing them for specimens.

The night was very disagreeable, for our hut of branches and leaves leaked freely, and the dense smoke which issued from the wet wood fire, round which my boys crouched with chattering teeth, was painful to eyes and throat. I have often been surprised that the native, who, in the low grounds, goes about and even sleeps in all weathers nearly naked, when I with my European clothing have felt it quite chilly, almost at once succumbs to the low temperature in the mountain heights, and often actually dies before he can descend. A few hours round a blazing fire after a hot jorum of coffee re-invigorated them somewhat, and far into the night the woods resounded to the weird monotonous chant of one of those epics to which the Lamponger is never tired of listening, and which his country is famed for, such as the Herculean exploits of that great hero, Anak Dalom, who, miraculously escaping from the interior of a bamboo, played the part of another Æneas along these shores. At length, when one by one they dropped off to doze, with their chins on their knees, their heads buried in their sarongs, the intense silence of the forest reigned, which even the moaning of the trees and the shrill screaming of the cicads could not disturb.

Resuming our ascent, I found that at 5800 feet the *Dipteris horsfieldi* increased in abundance, while lichens and mosses padded every stone, tree-trunk, and lower branch with a thick springy cushion of moss, among which everywhere the elegant flagons of the Pitcher-plants were embedded or swayed gracefully from projecting twigs. Here also, among the moss and on the fallen trees, a pretty *Cymbidium*, an epiphytic orchid with dark-green crisp foliage, carpeted in profusion the hollows and knolls. The whole mountain above 5800 feet seemed as if intentionally laid out in a gigantic rockery, up which the path wound under moss-padded arches, and over boulders on

which choice flowers had been planted; and as we ascended, other species of orchids appeared, and shrubby Rhododendrons with bright scarlet bells, (*R. tubiflorum* and *malayanum*). Nearer the top, the vegetation was mostly composed of lean-armed and straggling myrtles and shrubs of the heather-bell family.

Crowds of blue-bottle flies, a few bees, a couple of lepidoptera, and a small bird, with a *Ploceus*-like chirp, flitting about among the tall reeds, represented life at 7200 feet.

Before descending, I stood to watch the gathering of the clouds, which in the wet season begin toward midday to envelope the mountain-crests. Here and there white masses, like puffs of steam, would suddenly appear over the wooded lands below, principally over deep and naturally cold ravines, till the whole landscape was dotted with little flocks of clouds, and occasionally, even while I was looking, a white cloud would suddenly condense along the margin of the sea, and, travelling inward up the mountain side as a dense fog, which finally descended in heavy rain just as I got back with my collection to the rest-house of the previous evening.

Next morning I descended to the Balai at Terratas. After several days of drying and packing up my collections, I started back for our camp at Penanggungan, to prepare for my return to Telok-betong on my way to Batavia.

The road at this season, now well on in the wet monsoon, though of no great length, was excessively bad, so that the transport of my bulky herbarium in a dry condition became an anxious and difficult matter. Things went well till we reached the steep climb to the top of the pass at 2000 feet—eight hours of hard trudging, plunging and scrambling, with feet, legs, and bodies bleeding from thousands of leeches. From the top of the pass the road lay along a nearly level plateau for many miles, through virgin forest. Here the rain came down in cold, heavy lines, flooded the path and enlivened the army of leeches, which wriggled and stretched their green, bloodthirsty necks from every leaf and blade of grass. The journey at last became a dogged, cheerless trudge; I was past caring for any change of weather; things were as bad as they could be. Not a single word was uttered, except the intermittent "All'-il-allahs"—whose very woe-begoneness made me smile in

spite of the general misery of things—as the coolies changed their carrying-poles from shoulder to shoulder.

At nightfall we reached a small cluster of huts, where we camped thankfully for the night: and next day before noon the terrible burden was deposited with thankfulness within my old camp, where I found my Siamang in a sad state, suffering from a suppurating finger and tooth. On lancing the one, and extracting the other, the poor creature seemed greatly relieved, and I was delighted to watch it recover without having contracted any antipathy, but rather the reverse, for me. It accompanied me to Telok-betong, occupying with great composure during the long journey a seat on the top of one of my large packages, sheltering its head, to the amusement of all whom we met, under a Chinese umbrella which I had bought for it, and for which, after every halt, it held out its hand in the most knowing way, screaming lustily if the porters dared to move on before it had comfortably arranged itself.

I took it with me to Batavia, where I gave it to a friend to keep till a good opportunity should occur of sending it to London. It managed, however, to escape, and unfortunately took to the evil practice of hiding in the tops of the cocoa-nut trees, and dropping down—in the most playful way, I have not a doubt—its fruits on the passers by, till some irate half-caste, who had narrowly escaped a broken head, unworthily put an end to a most charming existence, to my deep regret.

CHAPTER III.

SOJOURN IN THE PALEMBANG RESIDENCY.

From Batavia to Anjer—Return to Telok-betong—Proceed to Beneawang—Leave this for the Blalau region—Camp at Sanghi—Camp in the forest—Phosphorescent display—Camp again in forest—Reach Bumipadang—Pass on to Batu-brah—Description of the village—Move on to Kenali—Description of the village—Proceed to Hoodjoong—Description of the village—Its tobacco industry—Its rice-fields—Planting and reaping—Superstitions—Goitre—Fauna and flora of the Besagi volcano—Birds and insects of the neighbourhood.

HAVING despatched my collections to England, in the middle of December, I turned my steps once more to Sumatra, to investigate the Highlands of the Bencoolen and Palembang Residencies. Just then, because of a break in the cable between Anjer and Telok-betong, a Government steamer was plying to keep up communication between the two stations, which the authorities kindly allowed me to make use of, if I should choose to proceed by that way. Accordingly, a day's ride in a *Kahar* brought me to Anjer, where I renewed my acquaintance with the beautiful view obtained from the verandah of the little that *was* there. Alas! that I should have to write *was*; for the cruel Krakatoa wave of dawn of the 23rd August, 1883, washed away the village, and with it the little inn and the kind Dutch landlady and her whole family. Having crossed to Telok-betong, I proceeded after a short delay across country to Beneawang at the top of the Semangka Bay. As I was making for the slopes of the Besagi volcano, the easiest route would have been to take steamer to Kröe, on the west coast, and thence by road eastwards; but I was desirous of seeing the scenery and the vegetation along the valley of the Semangka river, which, running south through the Sawah Mountains, falls into the sea at the top of its own bay. Although it was reported to be a very rarely followed route, I decided to attempt the journey; but it proved a more

difficult one than I had anticipated. I could find nobody to accompany me who had ever traversed the road before, or who could give me the least information as to the distance between their own last village and Batu-brah, the nearest in the Kröe district. The road at its commencement lay along the triangular plain occupying the cleft where the Barisan Mountains branch to form the eastern and western boundaries of the bay. Reaching in the afternoon the village of Sangi, at the confluence of the Samūng with the Semangka, I encamped for the night in its Balai.

Next morning, crossing the Samūng in small prahus, accompanied by twenty-five porters I proceeded along the eastern bank of the Semangka. As its stream, where at length the path crossed to the opposite side, was running with a very swift current and was nearly six feet deep, a difficult obstacle was presented to our progress. An hour was lost in building a raft, and a second in transporting the baggage. As the last packages, luckily for us, were being brought over rain began to fall, and within an hour of its commencement it would have been impossible to have crossed. The river runs between hills which for fifty miles rise very abruptly from its banks, and augmented by contributory streams rushing down steep, boulder-studded slopes, it swells with great suddenness. Over these violent side-torrents every bundle had to be transported by many carriers, each holding it by one hand, and steadying himself by grasping his neighbour with the other. In this operation several narrow escapes occurred; for, once losing foothold, no human aid could have prevented one from being swept into the main stream, boiling and roaring past in some places 150 feet below us, and often thirty yards in breadth.

The track was of the worst character possible, being obstructed by fallen trees and huge blocks of stone, and in many places obliterated by landslips, and often, where the distance between the trees was not sufficiently wide to admit between them the larger packages, a halt had to be made for the obstructing stems to be felled. Our intended halt for the night was a forest hut; but none of my convoy knew where or how far distant it was, if it existed at all. As the day wore on I became very anxious, for tigers abounded, and we had been crossing and following the fresh tracks of a herd of elephants

all day. As it was Christmas time, and we were near the fifth parallel of south latitude, darkness was due shortly after six o'clock.

At half-past five I desired to encamp for the night, but the ground was so wet and the leeches so numerous that the carriers begged me to keep on. The more heavily-laden porters had fallen gradually behind out of call, and those near me had become very rebellious under the distressing condition of things. Suddenly, even though expecting it, darkness fell on us, so dense that I could not see even the outline of the porter immediately in front of me. Buoyed up, however, by the hope that after twelve hours' march the hut must surely be near, we plodded on, till compelled by the ruggedness of the road to halt, with the intention of making a torch to light the rest of our way.

The only dry wood within reach was the interior of the bamboo, on which the baggage was slung. One of these was hastily undone and cut up, but no one had a dry match! My own stock was with the part of the baggage in the rear. My servant, however, had a flint and some tinder, with which, after a great struggle, he managed to light a cigarette. The only thing possible now was to try to make the cigarette ignite the dry scrapings from the interior of the bamboo. At length they caught; and hope brightened with the rising smoke; but a big raindrop drowned them both. For nearly an hour we laboured in vain to "make" fire, and the idea of lighting a torch or of proceeding further had to be abandoned.

The porters had thrown themselves on halting on the wet ground, and were fast asleep. All of us were drenched, but with the part of the baggage by me was, luckily, my waterproof sheet, containing a change of clothes and my Ulster-coat. After several attempts to adjust the proper garments to the respective portions of the body for which they were made, and throwing the waterproof sheet over my head, I sat down on a box to brave till morning the rain and the beasts of the forest, my hands thrust deep into my Ulster pockets. To my delight, my fingers found a piece of linen cloth bone dry. Starting up, I roused the man with the flint and rasp. We hammered away industriously for a weary length of time; at last we were rewarded—the tinder had caught. It is impossible to relate

in words how anxiously I nursed that fledgling fire; how tenderly I held it in the hollow of my hands while my "boy" fanned it gently; when it had grown a little, how we reared it in a hat before transplanting it to the ground where it almost expired from its cold touch, but the immense native umbrella-like hat shielded it till it was able to take care of itself. All hands were then roused to gather wood, and we had at length the satisfaction of feeling that the tigers would give us a wide berth, and no elephant, unless a rogue, would trample us down. Except a handful of rice at the ford, neither myself nor my men had tasted food since dawn, and, possessing a fire, we were hopeful that we might cook also; but, *of course*, the eatables were in the *other* part of the baggage! There was nothing, therefore, to be done but to sit down with what patience each could command and wait for morning.

If things were the opposite of comfortable or bright for my companions, I myself felt not a little compensated by the singular appearance of the forest, which was everywhere phosphorescent. The stem of every tree blinked with a pale greenish-white light, which undulated also across the surface of the ground like moonlight coming and going behind the clouds—from a minute threadlike fungus invisible in the daytime to the unassisted eye; and here and there thick dumpy mushrooms displayed a sharp clear dome of light, whose intensity never varied or changed till the break of day; long phosphorescent caterpillars and centipedes crawled out of every corner, leaving a trail of light behind them, while fireflies darted about above like a lower firmament. Trying to conceive what were the respective benefits conferred by this wonderful luminosity on these so widely separated species of living things, I dozed off to the lullaby of the weird forest moan, the clanging "kang-kang" of the horned frogs, and the not unmelodious wail of some night bird.

Break of the next day showed us in what a miserable spot we had encamped—on the edge of a rocky cliff, under the drip of the trees, not below their shade. We gathered together the scattered articles of baggage, which had been deposited anywhere and everywhere. Near me, hanging by its feet to a carrying-pole dead, drowned by the rain, I found the fowl for which I groped about, listening for its cackle

the evening before. Resuming our journey faint and in low spirits, we reached the dammar-gatherer's hut within an hour's walk. The dead fowl, hastily boiled with a little rice which had soured in the rain, was partaken of without complaint. The nearest baggage came in some two hours after us, the porters having camped without fire or shelter not far from myself, but the heavier part did not arrive till late in the afternoon, and not until I had sent out a relief convoy. When it arrived the men were too tired to proceed further that day, so we spent the night where we were. At sunset we feasted luxuriously, we thought, on the solitary fowl belonging to the owner of the hut, carefully reserving a limb for next day's breakfast.

The remembrance of our dismal surroundings on that evening haunts me still—a miserable hovel gauntly raised like a railway signal-box on high posts, in a clearing in the heart of the forest, amid the wild and melancholy confusion of felled trees, and with our view shut in by grey fleecy rain-clouds hanging in banks on the hills and low down on the tree-tops. The screaming of the cicads and the "koo-ow" of the Argus pheasants seemed more mournful than usual; there was nothing lively anywhere to relieve the gloom. In the little space which they had respectfully railed off for me I retired early to rest, and slept comfortably, notwithstanding the smoke from a wood fire and a spluttering dammar lamp, the steam from drying clothes and the aroma that filled the cabin, into which twenty-eight of us had managed to squeeze.

Next day the grey morning had hardly appeared before we were again on the march, striding along as fast as the deep tracks made by a bevy of elephants which had traversed the road the night before, permitted us. Mr. Wallace, in his 'Malay Archipelago,' says "of the great Mammalia of Sumatra, the elephant and the rhinoceros, the former is much more scarce than it was a few years ago, and seems to retire rapidly before the spread of civilisation. About Lobo Raman [a district more to the north-east in the Palembang Residency] tusks and bones are occasionally found, but the living animal is now never seen." In the district I was traversing the opposite seemed to hold. Within twenty miles of Telok-betong I have crossed a wide area over which elephants had committed

depredations but a few hours before my coming. The village people in these districts complained of the constant ravages done by them in their fields and pepper gardens, while the forest everywhere abounded with their tracks. Of the rhinoceros, on the other hand, I saw traces only a few times.

Some miles on in the forest we came upon a large stone by the side of the path, supposed to possess some influence over things terrestrial, for, as each of the porters passed it, he plucked a handful of leaves and, placing them on the stone, prayed for a dry day and good luck.* Whether it was through the influence of the stone or not we got a dry day, and I only wished that we had met with it somewhat sooner. All that day we pushed on by the side of the Semangka, which glided past us deep and noiselessly through a level plateau, crossing more than once from the one side to the other by some giant tree that had fallen from bank to bank, through dense forest in a sombre winding lane, beyond which we could see nothing but blinks of the sky, except where now and then it opened out on pretty sandy beaches which swarmed with species of metallic tiger-beetles and sand-bees, and where Sulphur (*Terias*) and Swallow-tailed butterflies (*Charaxes* and *Appias*), in gyrating flocks played on the damp ground by the water's edge.

Towards evening, emerging from the forest, our eyes were delighted by the sight of a small cluster of houses, the village of Bumi-padang, "the field of the world," lying a mile off, in a large open alluvial amphitheatre. But, the path suddenly giving out, presently we found ourselves floundering to the thighs at every step in a deep morass swarming with enormous leeches, out of which we could not extricate ourselves, as it seemed to stretch in every direction except behind us. On observing us the head of the marga and his chieflings, with the usual crowd following, came out to welcome and attend us back to the village. They came to the edge of the bog and sat down to await us; and doubtless the sight of our scattered cavalcade floundering in the slough afforded them not a little amusement—it was ludicrous enough to ourselves.

Here I dismissed the porters brought from the coast, and with a new retinue pressed forward with the break of day.

* See below in the closing Chapter of this book.

The road towards the high plateau of my destination rose at a steep incline, and with the rain that had recently fallen was horribly slippery; but the worst road has always something to brighten it, for where it approached or rose above 2000 feet I was gratified by finding broad fields of brightly coloured purple, yellow and white balsams, and close to the edge of the path many low herbaceous *Cyrtandreæ*, a family with chaste foliage and flowers; tall terrestrial orchids of numerous sorts, and many species of ferns. At dark we entered the village of Batu-brah, and I found ready for me, as the news of my coming had preceded me, a royal—compared with my late experiences—sleeping apartment in the Balai, with a table groaning under a load of fruits.

In the morning I was agreeably surprised by finding myself in a village of a character quite different from any that I had yet visited in Sumatra. The houses were high, large, and substantially built of planks raised for five or six feet on immense pillars formed of the largest trees of the forest, with pyramidal roofs, surrounded by an elegant ramshorn-like ornament universally used in the district, cut out of pumice blocks or of tree-fern roots, with a piece of mirror or a bright stone let into it to glitter in the sun. I did not camp here, but continued to Kenali, the capital of the marga, a large and very old village some miles eastward. Both sides of the road were fully cultivated with coffee, rice, but principally tobacco, for which this region of Sumatra is famed. Indian corn is also grown in considerable quantity, along with European and sweet potatoes and cabbages of excellent quality.

On our way we crossed a small tributary of the Semangka, which, at a little distance below the ford, narrowing from a river of thirty yards to one of a yard or a yard and a-half wide, dashed itself into a frothy torrent down a narrow rocky gorge in a series of falls for about 100 feet into the main river. The falls reminded me of those of the Clyde at Stonebyres; they are more picturesque, but less imposing from the difficulty of viewing them from below where the cascade plunges into the main river. The road from Batu-brah to Kenali runs along a high plateau of about 3000 feet above the sea, extending between the Barisan range and the volcanoes of Besagi and Sekindjau, and is composed of mingled clay and a sandy

pumice-stone tufa which, mixed with the black humus from the forests of centuries, has given its great fertility to the soil of this region.

The village, situated on a high bluff looking down on the river, is one of the oldest in the district, and is certainly one of the finest, cleanest, and most elegantly arranged that I had visited. One of its most noticeable features was its decorative art. The massive pillars, as well as the super-imposed beams and framework of the dwellings, were entirely covered with rich, intricate, and really beautiful carvings in an extremely hard black wood, which, after one hundred and fifty years by their data, appeared perfectly fresh and sound. The supporting beams, which rested on the pillars, projected some feet beyond the corners, and were ornamented with carved terminals, somewhat like the figure-head of a ship. A broad stairway of wood, sometimes with rails elaborately carved, led up to the doors. The windows were constructed of solid blocks of wood cut into oval or straight apertures, which could be closed by a correspondingly cut and rotating piece of wood in the inside. The divisions between the apertures were ornamented on the outside with different colours or inlaid with elegant designs in mother-of-pearl. The sides of most of the houses were made of panels of wood let into a grooved framework and accurately fitted, with the aid of very few tools, and often without a single nail. The Balai, always the best looked-after building in a village, was covered everywhere with rich carvings.

Finding to my disappointment that Kenali was too far from the Besagi Mountain where I wished specially to collect for a time, to suit as my headquarters, I was reluctantly compelled to remove to another village nearer its foot, some nine or ten miles further on.

Descending two hundred and fifty feet from the village, we reached the level of the river, and proceeded along its bank on a narrow alluvial flat for several miles by the edge of rice-fields, beautifully cultivated in quadrangular plots rising in gentle terraces, from which the irrigating water of the higher beds was conveyed by a neat contrivance of bamboo pipes passing under the dividing dykes and bent upwards to discharge in the lower terraces as low fountains, which had a

VILLAGE OF KENALI.

pretty effect in each of these miniature green-walled ponds, whose surface, save where the fountains played and for the silent circles of each outflow-vortex, was unbroken by a single ripple. As the terraces rose but little above each other, the blue sky was reflected as in a mirror along the whole valley, while the bright green of the young corn peeping up above the surface, by giving a green colour to the mirror without in the least breaking to the eye the placid surface of the water, or interfering with perfect reflection of the ever-changing face of the sky, produced a beautiful effect impossible to describe in words. Here and there, adding life to the scene, in the midst of these fields were smoking cottages embowered in groves of *Eriodendron* and *Acacia* trees.

Fording the river, the road took us, after a steep ascent, for several miles along almost a knife-ridge under a grand old avenue of virgin forest, at whose termination I half expected to find a stately castle or an ancient ruin. As we approached the village the forest became less dense, and we passed between a line of tall red-leaved Hanjuangs (*Calodracon Jacquinii*), a shrub sacred to their graveyards. Under this avenue of mourning, just outside the village gate, was laid out that one institution, at all events, common to the most exalted civilisation and the most debased barbarism—the Home of the dead. Each little mound, often surmounted by circular ornamented pillars of wood diverging from each other at opposite ends of the grave within a fenced and neatly tended inclosure, was planted with Crotons and beautiful-leaved shrubs.

The village itself surprised me not a little. It might have been a feudal castle. As its name, Hoodjoong or "the village on the verge," implies, it was situated at the extremity of the long narrow ridge along which I had come, and was inaccessible, owing to precipitous slopes dipping down into the deep valley on all sides except on the one we had approached it by, and there the road, rising in a short steep incline, passed into the village under a narrow gateway cut out of the soft tufa which hid the village till it was passed. All that was wanted to complete the picture was a battlemented tower or two over it, and the chains of a drawbridge and portcullis. The village looked down into a deep alluvial valley laid out in rice-plots along the banks of a stream whose double sources

could be seen as a couple of waterfalls, like long white streaks high up in the face of the Besagi, which formed the background of the view.

The villagers employed themselves chiefly in the cultivation of tobacco, sold under the name of Ranau tobacco, which, though not the true article, is little inferior to what is grown on the borders of the lake of that name. Great attention was given also to the cultivation of rice, which they grew as in Java, on the wet system, in plot-divided terraces. In Java the plots are allowed to run dry after the fields are harvested; but here not so, as they were kept carefully stocked with small fishes, which afforded to their owners a large food supply, while the mollusks, which infest the sides and bottom of these tanks, are abundantly eaten by the natives, who obtain from their calcined shells the lime for their betel-chewing. Several deep plots were entirely appropriated to the propagation of fish, and in them Water-lilies (*Symnanthemum*) and other aquatic plants grew in great luxuriance, dotting the surface with their large white and pink or yellow flowers, and giving to the fields the appearance of a garden.

The only periods when a really industrious spirit seems to prevail among these people are during the planting and the reaping seasons. Then the whole family—men, as well as women and children—turn out to assist, and remain in the fields from morning till dusk.

Before beginning to plant the crop, a charm is placed in a favourable and fertile spot in one of the plots, in order to secure a good harvest. Four of the finest ears of paddy from the preceding crop are stuck into the ground in the form of a square, and by the side of each a little wand of the leaf of the Areng palm, to whose extremity is bound a little packet of cotton-wool inclosing a few rice-grains of large size; in the centre of the square is planted a stem of Sasangai grass (which has a long and many-corned ear), with a fruit-bearing twig of the *Jambu* (*Myrtaceæ*) on each side of it. This, being interpreted, means: "May the rice of which this is a sample here grow in these fields stout and strong, and with heads as fruitful as this Sasangai, with corns as large as this sample, and as sweet as the Jambu." In the harvest time this little square is left to the end, and the lucky sheaf is carried last of all. This

VIEW NEAR THE VILLAGE OF HOOPJOONG, LOOKING TOWARDS MOUNT BESAGI.

reminded me of the "claik sheaf" of the northern counties of Scotland, for which a rich scytheful is selected, and of the superstitions attaching to its cutting. The fields must present here a picturesque sight in the reaping season, and one I should have liked to see, for the harvesters in their many-coloured garments and hats stand in the water amid the yellow grain and push before them narrow-pointed skiffs to receive the heads of corn as they are snipped off.

At other seasons of the year the people are lazy enough—that is, the male portion of them;—for the women almost entirely look after the dry-ground crops, the tobacco, coffee, maize, &c., and daily go to the fields to fetch the produce, returning with enormous loads in baskets suspended on the back by a cord across the forehead. The sole delight of the men is in tending their gamecocks. The villager carries one with him wherever he goes; and whenever his hands are free he may be seen with it under his arm, patting and stroking it. It is generally tethered by a cord to an elegantly made peg in some shady spot near the house; and, should another cock attack his captive pet, its owner will rush to its rescue more speedily than he would to the cry of his child.

Here and throughout the district goitre was extremely prevalent, nearly twenty per cent. of the people being affected. It is ascribed by some to the great loads carried by the women on their foreheads; but they did not seem more subject than the men. I saw even children of seven and eight years of age with the beginning of the disease. The natives themselves ascribe it to the soil, but why they could not say. I was told by the head of the village that in the Makakau district (to the north) which is notorious for its goitre, seventy per cent. are affected. The soil of the Hoodjoong district is a sandy pumicestone tufa. It is held by some authorities that the only important point established as to the rocks in which goitre does not occur is the absence of limestone and metallic impurities, and that endemic goitre coincides with metalliferous deposits, iron pyrites being in the fore rank. Later on in my journey I found on the Rawas river far less goitre, where we have Silurian rocks and some limestone and metalliferous—iron pyrites and gold—strata than on this pumicestone plateau, which is non-metalliferous.

Laid up for some weeks from ulcerated wounds, I was unable personally to do so much on the higher parts of the Besagi as I could have desired. From what my hunters and collectors brought in, it was evident that its elevation corresponds very nearly with that of the Tengamus—about 7000 feet—in the Lampongs; myrtles, ericas, rhododendrons and moss-loving orchids, and high-growing species of *Melastomaceæ* were among the most characteristic plants. It was trying to the temper to hear accounts of abundant tracks of the fine goat-like antelope (*Capricornis sumatrensis*) whose footprints I had so wistfully followed on the Tengamus without success. The return of my bird hunters, however, was always for me the great event of the day. As birds were very abundant, my collection increased rapidly. Among the more interesting species may be mentioned *Orescius gouldi*, one of the Trogons, the orange of whose breast washes completly out in spirit of wine; *Criniger gutturalis*, two species of *Myophoneus* (*M. melanura and M. dicrorhynchus*), which in the evening flitted about from stone to stone with a loud whistle, the former quite endearing itself to me by its blackbird-like form and habits; *Polyplectron chalcururus*, one of the *Phasianidæ*; and *Arborophila personata*, a little partridge, differing from the type in being more bluish-ash on the breast and more closely barrred with black on the back.

I was, however, able to entomologise among the sunny avenue-like roads that for several miles led away from the village, where flocks of *Cyrestes* (*Nymphalidæ*), spread their chastely marked wings flat on the ground, and delicate *Lycænidæ* disported in great numbers; of other Lepidoptera the more interesting species may be named: *Callidula javanica*, which emitted a strong and disagreeable odour; *Melanitis suradeva*, on stumps of trees under the shade; a fine new species of *Amnosia*; *Eurhinia fulva*, lately discovered in Tenasserim by my friend Captain Bingham; one of the prettiest species of the *Ecophoridæ*; two new species of that curious genus named by Butler *Homopsyche* from their singular resemblance to a *Homopteron*, and for which I at first took them; and *Botys deductalis*, a species known also from Ceylon, an island with which Sumatra seems to have many species in common; in Telok-betong I netted a small moth at light, *Pentacitrotus transversa*, also

represented in Ceylon. Frequenting dark-coloured tree-stems, I observed (and secured) some fine specimens of flocks of *Amnosia decora*. It has a curious habit of settling high up, then running down the trunk, stopping at intervals flapping its wings; then flying off to a neighbouring stem to perform the same manœuvres. A few miles from Hoodjoong I captured the *Eusemia belangeri* spread out on broad leaves of *Scitaminеæ*. It emits a powerful odour of cloves. Several species of lepidoptera mimic members of the *Agaristidæ*, but I did not discover here if *Eusemia belangeri* had a *double*. From the island of Nias (on the west coast of Sumatra) Mr. Butler has recently described (*Ann. and Mag. of Nat. Hist.*, July 1884) a moth, a species of *Euschemidæ* (*Panathia simulans*) which mimics *Ophthalmis decipiens* (of the *Agaristidæ*); while in Amboina, *Ophthalmis lincea* (which belongs to the same family) is mimicked by *Artaxa simulans* (of the *Liparidæ*).

CHAPTER IV.

SOJOURN IN THE PALEMBANG RESIDENCY—*continued.*

Leave Hoodjoong—Denudation—Great Arums—Sukau—Chiefs of the Ranau region—Tandjong-djati on the Ranau Lake—The high temperature of the water—Birds, fishes, interesting insects—Banding Agong—To Muara Dua—Through Kisam—Geological notes—Kisam villages—Coat of arms—Writing, dress, religion of Kisam people.

Leaving Hoodjoong in the end of January, I proceeded north eastward towards Mount Siminung and the Ranau lake district; repassing on the way Kenali and Batu-brah, I crossed the Semangka river near its head-waters, as a small stream running in a very deep valley of soft sandstone. In descending the face of the valley the gigantic results of denudation were very striking, where the rain of only one season had been sufficient to excavate enormous ravines. Even the rain of a few days had newly washed down thousands of tons' weight from its slopes. From this cause the whole country was exceedingly picturesque, sculptured out into singular and rugged outlines, steep gorges and precipitous valleys. From such a landscape one is able to picture faintly the effect of this vast levelling agent working ceaselessly through cycles of time, in carving and changing the face of the country and in planing down the mountains and table-lands, even where protected by virgin forest.

From the crossing of the Semangka river the road to the northward rises to the watershed of the rivers which fall on the one hand south to the Semangka Bay, and on the other into the lake Ranau and thence eastward by an arm of that immense river system which drains the whole eastern side of the Barisan range for more than 200 miles due north, and discharges itself into the Java sea below the queer half-floating town of Palembang. This mountain road, 3000 feet above the

sea, led me across as pretty and picturesque a piece of country as one could wish to travel through, winding round the head of deep glens, with occasional gorges to right and left which have left only three feet of ridge-path between them, and along the face of forest-clad precipices, hundreds of feet deep below which flowed hidden streams whose murmur bubbled up from among the trees as a pleasant music. In descending from the plateau I found at about 2500 feet, growing in sandy soil where it seems best to flourish, several stems of the giant arum (*Amorphophallus titanum*) one of the largest known herbs. The biggest of these specimens measured seventeen feet in height.

Descending from the northern face of the plateau, I was met by the chief and under-chiefs of the marga, at some distance from the village of Sukau, where I was to spend the night; and at the boundary of the village I was greeted by a crowd of the inhabitants and a band consisting of three youths—one in the middle fingered a flute which he had newly cut from a bamboo, the two others each beat a small bronze gong both of them cracked, which they carried in one hand suspended before them by a cord, tinkling it with a short twig in the other—who played me to the Balai to the notes perhaps of their margal anthem. Providentially the stateliness of the occasion made conversation out of place, otherwise, had it been necessary to open my compressed lips, I would have shocked the fathers of the people by the heartiness of my mirth, for never have I taken part in so ludicrous a procession with so solemn a countenance. Consider its composition: the musical advance-guard as I have described; the central figure under a hat as big as an umbrella, in garments the worse of repeated conflicts with the thorns and thickets of the forest, seated on a small steed caparisoned in a bridle with more knotted cords than leather in its composition and in a saddle that required every artful device to keep it from falling to pieces, his long, great-booted legs almost trailing on the ground; alongside on either hand the mute chiefs in duly solemn countenances, followed by a rear-guard of coolies with my baggage, and the general crowd of men, women and children—and who would not have desired to relieve his twitching pent-up risorius muscles?

Next morning I continued my way towards the Lake Ranau, and at the marches of the Kröe and Palembang Residencies,

the confines of their territory, my hosts of Sukau took farewell, and I was welcomed by the chiefs of the neighbouring margas, who conducted me to Tandjong-djati, the village where I purposed to spend some time. If I was the day before inclined somewhat to levity at the general appearance of the procession that greeted me, I felt embarrassed the other way on meeting these chiefs of the Ranau district. Sedate-looking men of middle age they were, dressed in neat black official coats, spotlessly clean collars, white starched trousers with a sarong girt about their loins, patent leather boots, and on their heads the imposing official cap, which I saw then for the first time, mitre-like in shape, covered with cloth of gold, while each carried in his hand a gold-topped stick bearing the arms of his Majesty of Holland, the insigna of his office. They looked such aristocratic personages and so faultlessly attired that I felt that I ought to descend from my horse and bow myself to the ground in return for the profound salaam with which they received me.

After the usual festivities given on the visit of a white man, in which the dancing of the maidens, attired in their best attire and jewels, is always a conspicuous feature, I settled into possession of my new home with a light and hopeful heart, for it was situated in a district considered to be one of the prettiest in Sumatra, by the margin of the lake looking out on the cone of the Siminung; but the very night of my arrival, whether by accident or by design is doubtful, some poisonous drug was placed in one or other dish of my evening meal, which induced profuse internal hæmorrhage that nearly proved fatal to me. Happily a strong emetic rid me of the noxious ingredient, and a few days of care restored me to my normal condition; but it is not a very pleasant reminiscence of the place.

The Ranau Lake lies 1700 feet above the sea level at the foot of the now quiescent—if ever within historical times active—volcano of the Siminung. From its shape, which is that of two irregular circles run together, it appears to occupy the site of an old crater. In the centre it is of *extreme* depth. At various points round the margin nearest the Siminung, hot springs of 127° F. of temperature bubble up, and warm the greater portion of the western end from 7° to 10° higher than

that of the air. It is abundantly stocked with fish and bivalve mollusca; but when they approach too near the warmer shore, where the temperature is above 100° F., the water instantly proves fatal to them. These springs and the very frequent earthquakes—no fewer than three occurred during my short stay—attest that, though the volcano is now quiescent, the interior of the earth here is in a very unquiet state.

Tall forest trees clothed the high margins of the lake, which descended here and there to grassy bays and level green swamps; on the sandy margins flourished fig-trees and Erythrinas with large bright scarlet flowers, on whose crooked stems flocks of blue herons (*Butorides javanica*) and pure white egrets (*Bubulcus coromandus*) constantly sat dozing out the heat of the day. In the early mornings they had busied themselves in gathering the leeches and insects from the backs of the buffaloes, by whom their kind offices seemed highly appreciated. On the high solitary trees perched clumsy, bald-headed adjutants (*Leptoptilus*), whose thin long legs always suggested the idea that they had escaped from some taxidermist's hands when he had just got the length of running the wires up their shanks. In the marshes snipe abounded in great plenty; grey djoo-jooats (*Tringoides*) on the sandy beaches, and shy water-hens (*Hypotænidia striata*) among the tall flags. The lake teemed with fish of many kinds, the best being the semah (*Leobarbus*) which, when full-grown, is as large as the largest salmon, and the katjubang (*Botia macranthus*), a small but most beautiful scarlet- and black-banded fish.

A few interesting captures of insects, many of them quite new species, were made here by the margins of the lake; especially may be mentioned *Xeropteryx simplicior*, previously known only from Borneo, and *Heterodes ansonialis*, described before from the far-distant Duke of York Island, east of New Guinea; and two splendid new species of *Papilio*, *P. itamputi* of Mr. Butler, and *P. forbesi* of Smith, allied to *P. aleidiades*.

The village of Banding Agong, whither I moved for a short time as the guest of Mr. Hisgen, the Controller of the district, was a delightful spot, situated at the south-east angle on a high but sheltered spot, commanding one of the finest views of the lake that can be had, exactly fronting the volcano and the

peaks of the Tapa Skandri, or Footstep of (no less a hero than) Alexander the Great, whom the chiefs of these regions claim, singularly enough, as their illustrious stem-father. The industry of the lake borders, for which it is famed throughout the Archipelago, is its tobacco culture, which is grown on a loose porous earth composed of the detritus of pumicestone mixed with humus. The finest quality is made from none but the very topmost leaves of the plant, and commands a very high price.

From the lake, on my next stage towards the Dempo, the road descended through the same picturesque country (in former ages probably the bottom of a Ranau lake greater than now) all the way to Muara-dua. This town, "at the mouth of two rivers" as its name signifies, is situated at the union of the Sako with the broad Komering river, and is the seat of a large trade by river with Palembang in cotton, tobacco, rice, timber, and "birds' nests"—the edible swifts' nests—gathered from dark calcareous grottoes in the neighbourhood. The town, though distant 200 miles in a direct line from the sea, is only 400 feet above its level, and stands really on the edge of the great alluvial plain which lies along the entire eastern shores of Sumatra, formed by the detritus washed down from the Barisan range into a sea whose coast-line, retreating by a slight elevation of the land, left dry this broad plain, which rises nowhere throughout its vast extent more than 600 feet above the level of the sea. Before its upheaval, South Sumatra could not have been more than 100 miles broad. Several great river systems, running in a general west-to-east direction fan-shape in form, traverse it, and are laying down along the margin of the land a further deposit, the slight elevation of which, for some thirty feet only between Palembang and the Island of Banka, would raise the shallow sea into dry land. Near the town of Muara-dua I was surprised to net a European moth (*Phragmatæcia arundinis*).

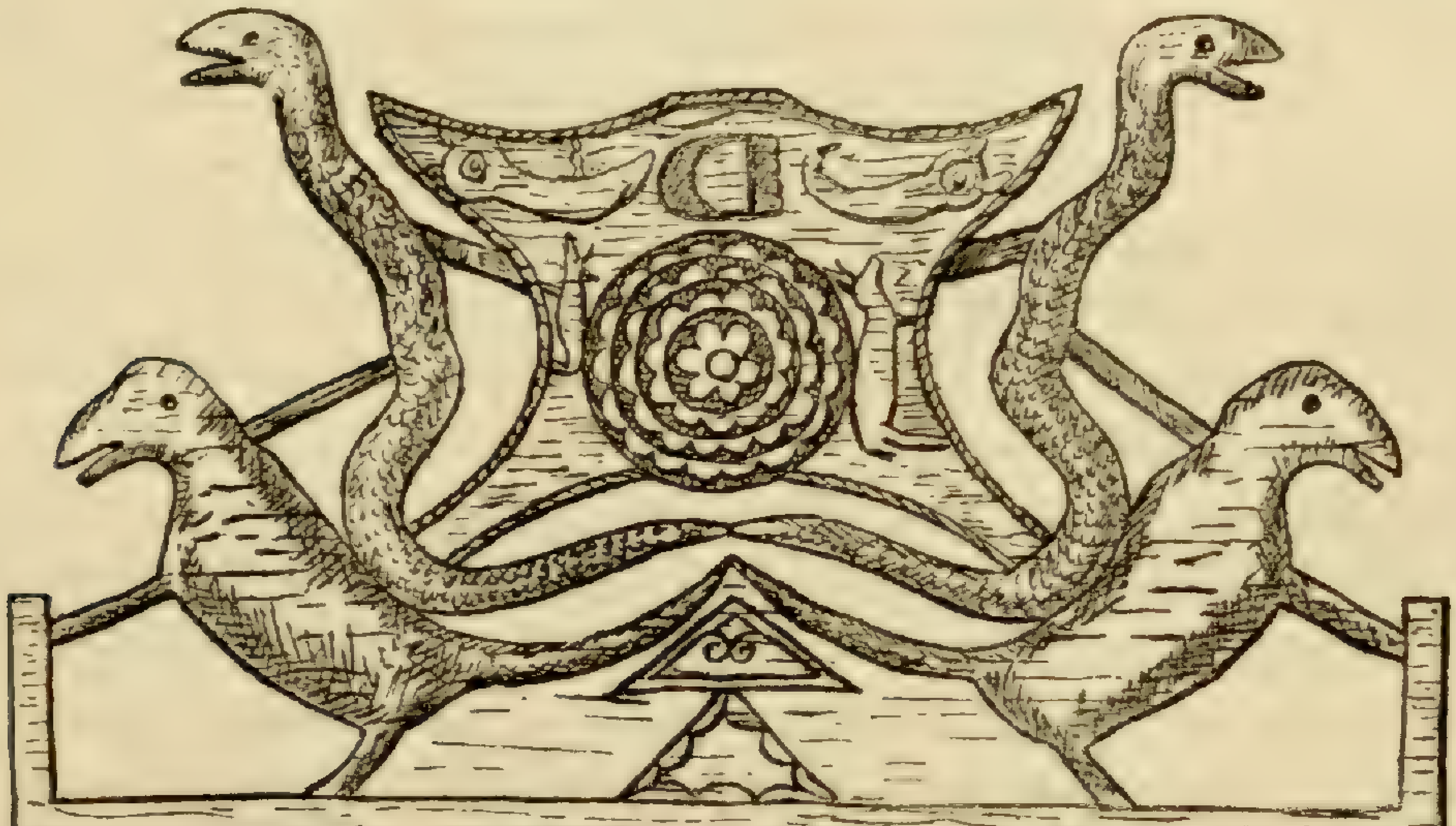
My further course northward traversed the sources of the great arms of the southern of these systems.

Sending my baggage on to Pengandonan by the level road on the low lands, I proceeded on foot thither over the Kisam Hills. Just above Muara-dua the Slabung river was crossed by a very high suspension-bridge of a most picturesque construc-

tion. In the form of a segment of a great circle, its floor was of cylindrical logs securely tied to three gigantic rattan cables the true supports of the bridge, fixed to the shore pillars; over these logs was a close bamboo basket-work pleasant to the nude foot of the pedestrian, railed on both sides, and protected overhead by a close thatched roof—the whole forming a long hanging cage, which swayed freely as it was traversed. From this bridge I again ascended abruptly on to what was once in all probability the bed of the Ranau lake before its dimensions were interfered with by upheavals. The rivers I passed had cut deep rocky gorges, down which it required some care to pick one's steps, through the strata of 150 to 200 feet in depth, showing the pumicestone tuff superincumbent on Tertiary rocks of Eocene age containing fossil *Cypræa*, *Teredina*, and *Pecten* shells. The whole country was undulating, and full of alang-alang grass, and low second-growth forest which presented in itself little of interest, and prevented any view of the surrounding country.

The houses of the Kisam people were of a pattern of their own. They were mostly of bamboo wickerwork fitted into a framework of wood, and slated with little boards of cedrilla wood. Each house had built out from it a chamber on the same level with it under a slightly lower roof, which was used as a lounging place for the owner and a sleeping room for visitors. The door was reached—as the houses stood on tall piles—by a slanting tree-trunk, in which a series of notches only large enough to admit the toes served as steps, and up which a booted traveller found it no easy matter to ascend. The space below the house was blocked with chopped-up wood, whose primary use was, doubtless, as a protection against the entrance of thieves or attack from below by enemies, as it is apparent how easy it would be to thrust a spear or other instrument through the bamboo floor into the bodies of the sleepers resting on it. The beneath of a man's house is considered almost as sacred as its interior, and their laws attached supreme penalties to the crime of being found at night there. The house framework in most of the villages was elaborately carved in intricate patterns executed with the most patient care. In Padjar-bulan, a very old village which I passed through, the decorative carving far exceeded in profusion and

excellence that in any of the others, especially in its Balai, where I was greatly interested in finding what I may call a veritable coat of arms, carved out of an immense block of wood and erected in the central position, where one would expect an object with the significance of a coat of arms to be placed. From what I could learn it had such a significance in the estimation of the chief of the village; for he told me that only such villages as could claim origin from some distant village could erect such a carving in their Balai. I am not, however, master enough of the terms of blazonry current in the College of Arms to describe it in fitting language. The shield had double supporters; on each side a tiger rampant



COAT OF ARMS IN THE VILLAGE OF PADJAR-BULAN.

bearing on its back a snake defiant, upheld the shield, in whose centre the most prominent quartering was a floral ornament, which might be a sunflower shading two deer, one on each side—the dexter greater than the sinister. Above the floral ornament was a central and to me unintelligible halfmoon-like blazoning, but on either side of it was an "ulai lidai" (Chorus of bystanders: "Undoubtedly an ulai lidai"), but of what it was the similitude among created things, beyond suggesting faintly the lineaments of a scorpion, I was not pursuivant enough to recognise; on the sinister of the two, however, was a man "tandacking" (dancing). Below the tips of the conjoined tails of the supporting tigers were two ornate triangles, the upper

balanced on the apex of the lower, which might with truth be described as the supporter of the whole, but whether these bear any reference to the mystic signs recognised by the Worshipful Lodges is a question that I must leave for the Chief Mason to settle as best he can with the Chief Herald. I feel inclined, however, to assert that it was as good an escutcheon, and as well and honourably emblazoned, as any that ever emanated from the College; and who dare say that it is less ancient? The sight of that emblazoned board and its carved surroundings, hid away in a small little-known hamlet in the Kisam hills among a half-savage and pagan people, astonished me not a little, and added respect to my farewell salutation to its chief.

The Kisam people write in a character called, from its being inscribed on bamboos with a *pointed* knife, *rentjong*, differing only slightly from that used in the Lampongs, which nearly all of them—women included—can read and write. During my journey I was able to obtain several interesting bamboos inscribed with their songs. These pantuns are metrical compositions consisting of lines of eight to ten feet in length, sometimes rhyming and sometimes not; but they are curious in that after every few lines one or two others which have absolutely no meaning in themselves, or connection with the composition, are interpolated; some euphonious word being caught up and added to others more or less alliterating with it, to make a good jingle of sounds.

The dress of the women is remarkable for its shortness and scantiness. As a rule their single garment is made by themselves in the pattern peculiar to their district, from their own home-grown cotton or silk. But the cultivation of the silkworm is now almost abandoned, since unrestricted intercourse with Palembang, and through it with the outside world, brings the products of foreign looms to their out-of-the-way doors with less trouble than they can make them for themselves. Thus are the waves of civilisation sweeping away the indigenous industrial arts of the people, and flooding out their manufactures, turning the hereditary craftspeople to other occupations.

The people are pagan, believing in the influence of the spirits of their dead forefathers. Near the village of Gunung

Megang I came on their burial-ground, laid out in the forest by the pathside—a great elevated quadrangular mound, in length just enough to admit a full-grown body. A rough stone at head and foot indicated where each person lay side by side with his neighbour. Only the married people are interred in this common burying-place, in the right, perhaps, of their being parents of the people; all others, youths and infants—useless off-shoots of their race—are buried anywhere in the forest, and always some distance from where their elders lie. An unmarried woman about to give birth to a child is compelled to leave the village and retreat to the forest, whence after some forty days of solitary sojourn she returns—never with her offspring—and the village is purified by the sacrifice of a buffalo. Their most sacred oath is sworn by placing a hand over the grave of their forefathers amid the incense of benzoin, or in a circle drawn on the ground: "May the spirit of my forefathers afflict me if I have spoken falsely," being the formula. The same manner of swearing obtains, I am told, among the inhabitants of the Makakau, Komering (Muara-dua), Semindo, and Blalau (Hoodjoong) regions. The Kisam people swear also by drinking the water in which a kriss has been dipped, as well as by the spirit of Tuan Raja Gnawo, who has his dwelling-place on Mount Dempo.

CHAPTER V.

SOJOURN IN THE PALEMBANG RESIDENCY (*continued*).

From Gunung Megang—Luntar—A surprise—River Ogan—Curious hills—Ornamental carving—A village fair—A cock-fight—Into the Inim Valley—Muara Inim—Lahat—Passumah lands—Ceremonial formulas—The people—Marriage ceremonies—Illegitimate births—Religion—Death superstitions and rites—Sculptured stones—Interesting visit from Bencoolen men.

TAKING my departure from Gunung Megang, and crossing the watershed into the Ogan valley at 2000–3000 feet above sea-level, I descended towards Pengandonan. Passing through the village of Luntar, I found the chiefs of the marga and a great concourse of people from all the region assembled on the third anniversary of the death of the Headman's father, to secure the welfare of his soul by feasts and sports. Here was waiting for me the Pangeran of Pengandonan, which was the adjacent marga. After a liberal refreshment of tea, with the ubiquitous Huntley and Palmers' biscuits, and a Palembang baked comfit, made principally of sago and the hashed-up flesh of a fish (whose large scales, dyed of various colours, are extensively used—and admirably adapted for the purpose they are—to cover or "tile" over the large leaf hats used in the district), and some ripe juicy oranges, I set out with my host for Pengandonan lower down on the opposite side of the Ogan. We crossed the river on a raft at a very beautiful spot at the confluence of the Laham and the Ogan. On our left were several curiously formed, abrupt hills; facing us was the bare-topped, calcareous peak of the Riang rising sheer from the bank, and just above the ferry was moored a flotilla of rakits—those picturesque floating houses by which the produce of the region is transported to the coast, which to the trader are ship and comfortable house for many days together on these great rivers.

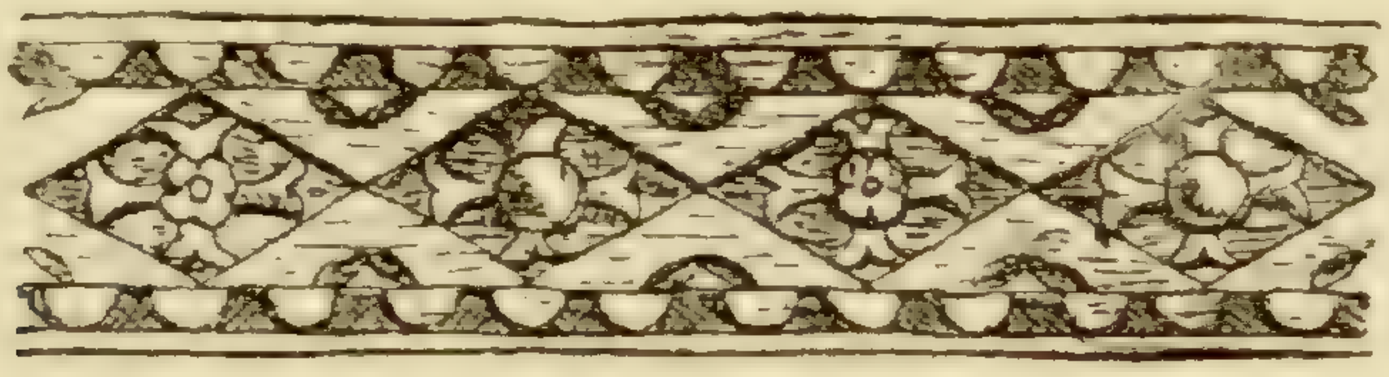
A short intercourse with the Pangeran served to show that he was a native far superior in intelligence and ability to most of the chiefs about him. Though dressed no better than the ordinary native, and preferring his sandals—whose possession is always a mark of superiority—carried behind him to wearing them, he had even more than usual of the easy dignified politeness and gentlemanly bearing of the higher Malays. Yet when, a few yards from the river bank, below a shade of trees, we suddenly came on a neat carriage evidently waiting for some one, so little was I prepared for his reply to my surprised query, "Whose is the carriage?" that it almost 'took away my breath' when he quietly but not without a little pride, said, "It is mine." The carriage was drawn by a pair of well-kept black ponies, furnished with every European appurtenance. It certainly was incongruous, one felt, this spanking pair, with bright silver harness, whirling through villages of poor-looking cottages without one refined taste to match this specimen of high civilisation in their midst. Every village we passed through poured out its inhabitants to see the bright equipage, which, though housed quite near, was evidently a by no means common apparition. The women stared with open mouth, and the children, in all the clothing nature had given them, raced us for a long way, shouting with all their might. It was evident that the Pangeran, satisfied with the honour of having purchased such a possession, was not much given to indulging himself in the use of it, if one may judge by the undaunted way, utterly regardless of dynamical principles, in which he took the most rectangular pieces of a road never made for a carriage. Perhaps I may misjudge him, and he may have so accurately known these principles as to be able to drive within an inch or so of the centre of gravity without dislodging it. He never eased up to a corner; even a double right-angled "hook" was described with wonderful precision, if not with the utmost comfort. Holes or no holes, logs or no logs in the way, he never drew rein till we halted for good at the door of the Pasanggrahan, a rest-house which he himself had erected on the right bank of the river for the benefit of officials visiting the district.

From the verandah of the house the scene, which could be leisurely watched as I comfortably rested, was one of great

interest. Across the river the village of Pengandonan glinted through the palms; the villagers were constantly going to or returning with loads of fruit and vegetables from the fields in little boats, or poling up and down or across the river on narrow rafts of five or six short bamboos lashed together; there was a constant stream of women and children either to bathe or to wash rice or to fill with water the basketful of bamboos slung behind them. As every one wore more or less brightly-coloured garments and cylindrical hats painted with dragon's-blood red, the scene had no lack of colour or life to make it a pleasing one. When the rain-torrents brought the river down in flood, as it did about once a day, the scene was still more lively. The whole population, men, women, and children, swarming out like a disturbed ants' nest, with creels, hampers, baskets and nets, dashed in up to the very eyes, where the force of the stream was broken a little, to scrape the bottoms and sides of the river for the fish (which have taken refuge there out of the current), allowing themselves the while to be floated down the stream for some distance; then, running up stream again, shouting and laughing, they dashed in for another and another bout. These floods sometimes quite cut me off from communication with the opposite side; and as my cooking was all performed in the village, I was constrained sometimes to go dinnerless to bed. When a few hours' rain is sufficient to flood the river so as to bring down fruits, branches, large trees and (as I saw on one occasion) a broad slice of ground with the bamboos growing on it, one who has not seen it can but faintly imagine the volume and power of such a river after the incessant rain of several days.

A curious feature of this place was the abrupt hills of which I have spoken. Composed of calcareous crystalline rocks, probably of Eocene age, they appear to have been in ancient times the boundaries of the ocean in which was laid down what is now the plain of Eastern Sumatra. The Peak of the Riang, the most abrupt of them all, is the highest land between itself and the coast, distant in a direct line one hundred and twenty miles, and commands a magnificent panorama of a long stretch of the Ogan valley, running between deep barriers, the sun-flash on whose surface guided the eye all

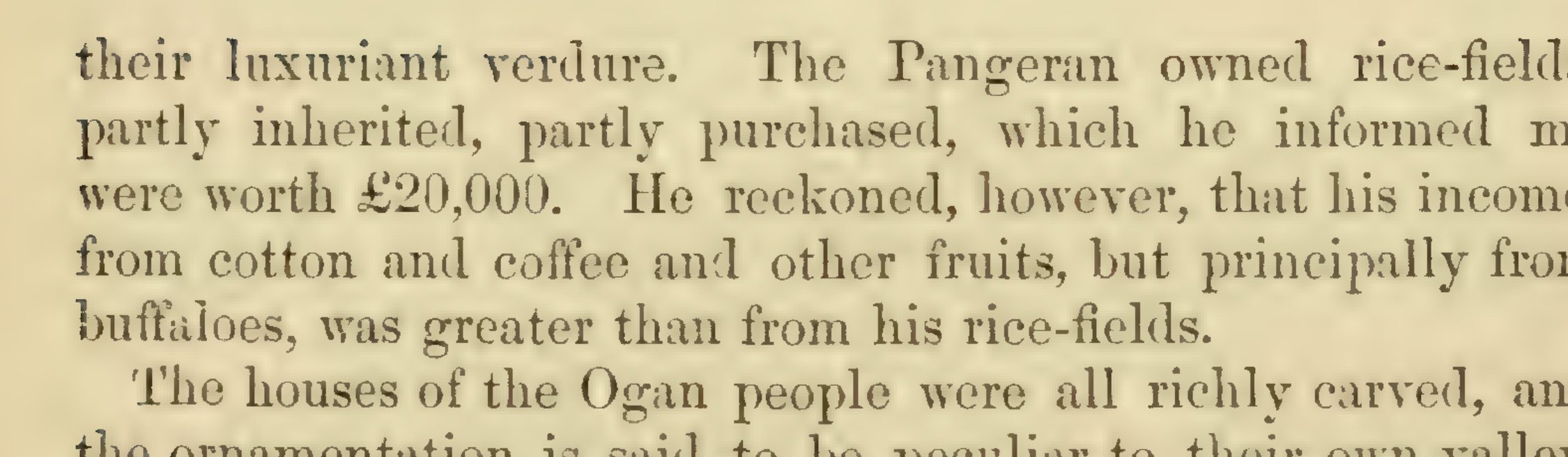
along its winding course till it disappeared through a narrow rocky gateway into the blue sea-like plain of Palembang. Below, fields of young corn, dotted with small watch-huts which were so utterly embowered in *Convolvulaceæ* that they seemed to be simply immense bunches of yellow and purple flowers, covered the rich flats all along both banks, and might themselves have marked out the course of the river by



TATA BUBUR-TALAM.

their luxuriant verdure. The Pangeran owned rice-fields, partly inherited, partly purchased, which he informed me were worth £20,000. He reckoned, however, that his income, from cotton and coffee and other fruits, but principally from buffaloes, was greater than from his rice-fields.

The houses of the Ogan people were all richly carved, and the ornamentation is said to be peculiar to their own valley.



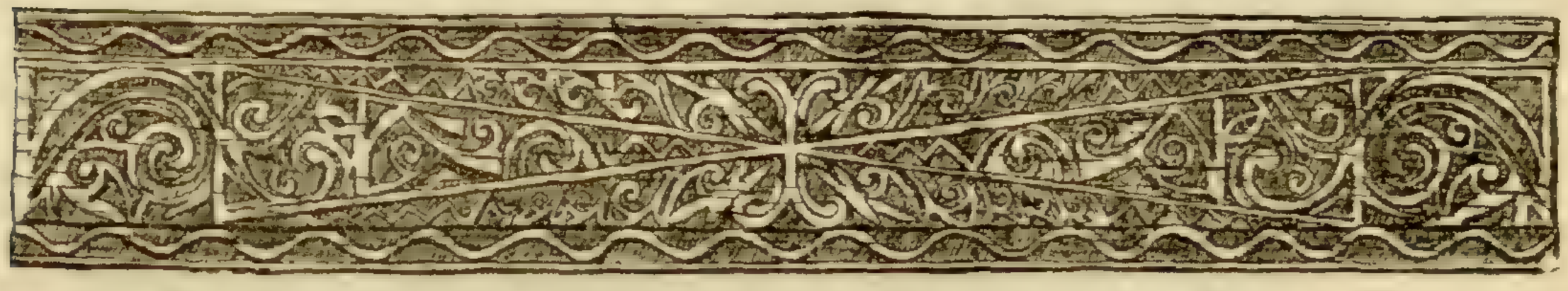
TATA SIMBAR AND TATA AWAN.

The Semindo men (a district lying about a day's journey to the west) are credited with the invention of the designs; but the Palembangers, who are famous workers in wood, are generally the builders, and accommodate each district with the style of "tata" or ornamentation peculiar to itself, which it has retained for generations. The accompanying sketches will illustrate the designs most in vogue. On the lowermost

LOOKING DOWN THE OGAN VALLEY FROM THE RIANG PEAK.

beam, or *Tailan-luan*, that resting on the pillars, we have the carving represented on page 186, and called *tata bubur-talam*; the second figure represents the carving on the *Palatan*, or the lower beam of the framework of the house; where the *tata simbar* commences the designs, followed by the *tata awan*, which either continues the whole length of the beam alternately reversed till it is closed again by a second *tata simbar*, or both are used throughout alternately erect and reversed. The interior of the raised portion is either left uncarved or is adorned with the foliage and flowers, of which the outlines appear in the design. This is the Ogan pattern *par excellence*. On the door-posts I found in some houses *tata ramo-ramo* (*ramo* means, wild beast) which is not true Ogan, but adopted from the Semindo people, and it is extremely interesting to observe how effective an ornament has resulted from the representation of a tiger or some such animal, in which the

TATA RAMO-RAMO.



SEMINDO CARVING—TATA OTAR GAMOOLUNG—ON A HOUSE IN PENGANDONAN.

eye has become a floral ornament, and the legs and tail have developed into scrolls.

On the last day of my stay here I spent a forenoon with my host in seeing the sports still going on at the neighbouring village of Luntar, which were preliminary to a feast which was to close the some twenty days' festivities—a sort of high pagan mass for the rest of the soul of its Chief's father. In the village was collected a large crowd from surrounding margas and even from as far as Palembang, the scene

resembling a village feeing fair at home. At the outskirts we came on small booths for the sale of eatables, fruits, and sweetmeats; but everywhere else each little crowd had in its nucleus a gaming-table of some sort. First favourite was a stall where a mat spread on the ground was marked off into various denominations of staking, odd or even, and on any number up to five. Its presiding genius, with a countenance as stolid as the most approved banker at a roulette table, squatted on the ground with a saucer before him, on which he twirled the fatal teetotum, and with a most professional air covered it up with half a cocoa-nut shell so that it might run fair. When the "gentlemen" had all done staking, he lifted the lid with a flourish, declared the fates, paid his losses, and gathered in his little pile of gains, without moving a muscle of his face. He was a Palem anger, this sedate banker, with a sharp eye and a cruel expression of countenance, and, having learned wisdom, doubtless, among the comers and goers of that great commercial centre, he had come up the water to operate on the simple natives here. His stall was constantly surrounded by an eager crowd of patrons, ranging in age from eight years to forty harvests, who staked with untiring zeal various sums, from the two-fifths part of a penny up to two or three shillings. Games of chance of a like nature were going on in all directions; but I moved on to witness the heroic sport—the noble and national game of the country—*Nyabung*, or cock-fighting.

The cock-pit, or Galanggan, was a large enclosure some twenty feet square, railed in by stakes twelve to fourteen feet high, sufficiently far apart to enable those outside to see all that went on within. The cocks about to fight were handed over to the care of two officials, whose office is to direct affairs in the ring. By them were attached with scrupulous care long double-edged steel spurs, sharp as lances. As soon as the sound of the bedoog announced that this arena was to be occupied again, all other sports were instantly deserted, and the crowd pressed round the Galanggan. The cocks were brought into the ring by the proper officials, each holding his bird carefully with its leg armatures sheathed. Into this enclosure no one but the officials, the owners, and some favourite few were admitted. The two cocks were then held up before each

other by the *gu'angs*, who ruffled for them their neck feathers, tugged their combs, patted them on the breast and sides, and shook them with a tremulous sort of instigating motion, performed with a knack and neatness which indicated the professional hand. This manœuvre whose execution is the envy of onlookers, is imitated by the children in the miniature cockerel fights that they get up before they are old enough to speak. When the fowls had been thus irritated they were allowed, while still in the hand, to have one dig at each other just to put them on their mettle, and with their terrible armatures bared, they were set facing each other, a few feet apart; and then came the charge. I shall never forget—for I was utterly unprepared for it from the stolid Malay—the yell and deafening shout of savage delight and excitement that arose from the up to that moment mute and eager but, to all appearance, unexcited crowd as the combatants rushed at each other, and which was kept up all the time the conflict lasted; nor how the gulangs, following on hands and knees, each close behind his fowl, watched each movement in silence with a glaring and excited eye—the rules of the ring prohibiting them from touching or reinstigating the cock during the continuance of a round—like nothing I can think of so much as the intense motions of a pointer close behind a warm scent, and at every onset they scanned their bird from side to side to see if it had sustained any injury. In the first combat that I witnessed both cocks were badly wounded in the first round; one even fainted away. The seconds and supporters carried each their bird aside to apply restoratives, if possibly they might be able to continue the contest to a final issue. They bathed its head with cold water and administered some with a feather down its throat; a cloth was held over it to keep off the sun, and smoking pieces of wood held under its nostrils and over its comb. For a time it seemed as if the worst wounded would have to be declared vanquished, as it was unable to enter the lists, but his spirit came again on instigating him with a strange cock for a few minutes. After the same preliminary patting and facing and the solitary dig, they were again allowed to rush at each other; but after a few skirmishes the badly wounded bird turned tail and was declared the loser. In the second of the only two fights I ever

witnessed the combat was very short, but very fierce. Both birds were sorely wounded at the commencement, but in a short space one rolled over mortally wounded, with a gash in its side through which the four fingers could be passed. After both fights there was immediately heard the clinking of money, and a general rush to the Balai was made to settle their bets. Often £30 to £40 may be laid on a cock; and in a day's gaming as much as £250 has been known to change hands.

Cock-fighting is now strictly prohibited by the Government, which, only on special occasions, gives for a limited number of days permission to the chief of a marga to hold a tournament within his district, and for whose good conduct he is responsible. He is allowed to charge five per cent. on all transactions which take place, and a fee from all stall-holders as a sort of recompense for directing the affair and keeping order. With this percentage the Pangeran is able to provide a buffalo at little cost to himself, which is slain on the last day of this Vanity Fair, and followed by a general gormandising. From the nature of this whole entertainment one may hope that the dead Pangeran advance a full stage in bliss.

The heavy rains that had delayed me several days here having cleared somewhat, I proceeded on my way northwards; and, crossing the watershed of the Ogan, descended into the valley of the Inim, a large tributary of the Lamatang, another of the great branches of the Palembang river. The village customs in each of these great valley systems differ but slightly from each other; yet each has some distinctive characteristic; each has its own style of architecture; and each its own pattern of garments and hat-ornamentation. In religion the Inim people are Mahomedans. They bury their dead, however, in one large mound with the head eastwards; the women lie alongside their husbands, but the children are buried anywhere their parents may wish, only never in the village mound.

It was interesting to note how the navigability of the rivers influence the people even far inland. In these reaches I found Islamism of a purer form, and the people more learned in civilised ways; while in the upland regions not geographically distant, such as Kisam, Makakau, Semindo

and the Blalau districts, which I had just traversed—high plateaus with which communication is difficult—the people still followed the pagan superstitions of past ages, and continued the customs and rites of their great-great forefathers with little change.

Passing through the village of Darma, where I noted with curiosity the skulls of divers species of animals nailed to the gable end of a house, which pertained, I was informed, to its Pangeran's *Tukang-binatang*, or gamekeeper—a fact I might have guessed without asking (had I imagined that Pangerans had among their retinue such an official), since I was myself an inhabitant of a land where his professional brother hangs out as marks of his prowess a signboard just as barbarously garnished with the bodies of owls and hawks, weasels and inoffensive little squirrels, and every rare feathered bird that visits his neighbourhood.

I halted for the night at Muara Inim, a large village at the confluence of the Inim with the Lamatang and one of the important centres of commerce and civilisation in the Residency. Once a week a small steamer comes here—120 miles from the coast—bringing mails and passengers and all the merchandise for the north-western Highlands of Palembang. It is the starting-point of the main cross-country road to Bencoolen and Padang, which after crossing the Inim ascends the western bank of the Lamatang through a rather monotonous strip of country, which I beguiled by examining the coal bands (of Pliocene age) that crop out at various points in the clayey marls on the roadside. Suddenly turning the corner near the village of Merapi, the traveller comes face to face with one of the most singular and picturesque mountains of Sumatra—the Cerillo Peak—which, though high, is, owing to the configuration of the country, not seen till one is close at its base.

The Cerillo is a tall conical mountain on a somewhat narrow base, rising irregularly till about 800 or 1000 feet from its summit, when it suddenly contracts into an inaccessible acute spire, like a gigantic finger pointing heavenward. I was not surprised to be told that among an ignorant people its singular shape had invested it with superstitious dread. The natives make long pilgrimages to it to speak with the Dewa that they

believe resides there, ascending to the highest accessible spot, where incense is offered and other ceremonies performed.

A little farther on, as I neared the village of Lahat, the summit of the volcano of the Dempo whither I was bound, raised its head in the distance. After resting for a couple of days in the town, enjoying the hospitality of Mr. Van Houten, the Resident of the district, I pressed on north-westward. After a journey of a few hours up the Lamatang valley I entered, on climbing out of the gorge on to its high bank, a landscape with entirely new features. I looked out on what appeared to be an immense white sandy plain, which in reality was the plateau of the Passumah Lands, covered with grass, but with scarcely a trace of a tree anywhere—one of the singular features of this region, and one by no means common in the tropics. It is said that for at least 300 years there has been no forest here; but that previously, however, there were trees which had been destroyed by a great fire. That a conflagration should have burned up such an immense tract, leaving no clumps or uninjured seeds of any kind in the soil to start a second crop of arboreal vegetation, seems very doubtful. In Ceylon however, in the midst of great forest regions, there occur tracts, marked off with singular sharpness from the surrounding forest, in which no trees are to be found. Perhaps the bareness of this plateau may be the result of some such train of circumstances, or perhaps it may owe its peculiarity to the effect of eruptions of the overshadowing volcano, towards which the plateau slopes gently upwards.

At noon I reached the first of those singular gorges which are another characteristic feature of the plateau. Its sides descended precipitously to the bed of a small river which was running in a narrow channel cut through the solid rock, on which the marks of the former levels of its water were plainly graved, and descended under a narrow bridge that spanned it in a series of pretty cascades. A few miles farther, on taking a sharp turn of the road, I suddenly found myself on the brink of a precipice over whose edges I could dizzily see, more than 500 feet sheer below me, the foaming Endicat river spanned by a picturesque roofed bridge. Till close on the edge of the precipice it was impossible for the eye to detect the slightest sign of a gorge; it roamed over what seemed a nearly level

country. The descent and ascent were made by long difficult corkscrew paths cut in the face of cliffs, that were densely clothed with trees which from the steepness of the slope clung close to its sides. On again gaining the level of the plateau, and looking back from a little distance, the eye ranged over the chasm without perceiving any trace of it. This scenery recalled the descriptions I had read of the singular cañons of the Yellowstone River in North America. At frequent intervals over all the plateau I passed tabats or lakelets of various sizes, the result probably of slight subsidences of the ground which, curiously enough, are full of fish, though they have often no river running out of them. The same afternoon I reached Bandar, and the next day held on to the village of Pagar Alam.

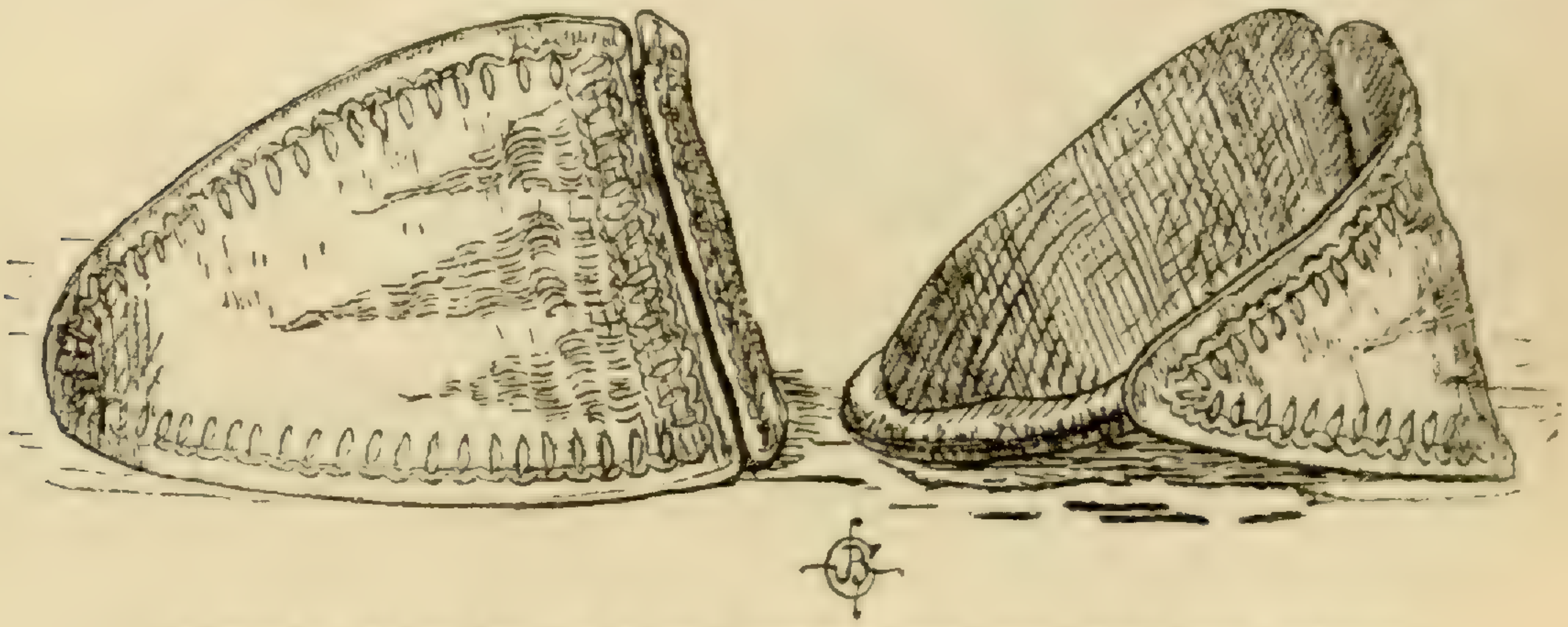
From Pagar Alam to my destination at the little village of Pau, lying 3500 feet above the sea level on the slope of the Dempo, where it begins to raise its majestic mass more erectly, was but a forenoon's march. The village of Pau was very small, and its Balai of minute dimensions. Without an hour's delay, however, I set about enlarging and rendering it habitable. By the combined efforts of the greater portion of the inhabitants of two villages which lay within a few minutes' walk, we floored the place, railed off a part for a sleeping apartment and fitted a bed into it, furnished the outer portion with a table and a door, which we made out of that blessedest of all the vegetable productions of a toolless and saw-mill-less land, the bamboo; and before night I had unpacked all my baggage, books, and apparatus, and settled into my neat abode with feelings of the utmost satisfaction and contentment after my thirty-five days' march. The village lay on the road leading to Bencoolen, and as once a week a large market was held near Pagar Alam, I had an opportunity of seeing not a few of the people of the districts towards the sea-coast, as they came often to the markets in the way of trade, and often passed a night in the village. As a sort of good-will exhibition towards the villagers, and a return for their hospitality they would often give a musical performance, or engage in a dance. One of the latter interested me much. The dance itself was very much like the Lampong dances, calm and attitudinal, but with the addition of lighted tapers,

fixed in small saucers held in the hands. The seriousness, however, of the performance was enlivened by the introduction of a comical element. Closely imitating in an exaggerated manner all the motions of the dancer, but affecting to keep in his rear and out of sight, was another dancer simulating the fool, who was quite ignored as if entirely unperceived by the principal performer, but at whose remarks, gestures, and grimaces, all the people laughed heartily. Here we had the simple elements of the theatrical performance—an embryo play with two performers.

When one asks a Passumah man whence his forefathers came in the *Tempo-dulu*, in the days of yore, the reply is often either from Dewa, or from the sun, or from Alexander the Great (Sekander Alam); but to most of them the matter is shrouded in mystery. Hearing, however, of a chief of a distant village specially learned in these matters, I sent for him to come to visit me. He was the son of a very high chief in their independent days, and as such, the history of the Passumah Lands had been instilled into him from a boy, as part of the education that belonged to his rank. I found him wonderfully versed in all the old ways and customs of the Passumah people, and my only regret is that I had not then the knowledge on which to found many questions which I should now like to know replies to. I wrote down from his lips many of their strange ceremonial formulas, which are difficult to find nowadays save inscribed on some old bamboo or lontar-leaf, which may have happily survived the ravages of the boring beetle and the frequent village fires. Not the least curious was his account of the creation: How different sorts of birds, with curious but not meaningless names, produced eggs from which in the fulness of time escaped the solid earth and the sky, the moon, the stars and the sun; then the grass plains and the forests, the sandy shore and the coral; how the sky wept and there came the rains and the deep sea; how then the Dewas were, and the hierarchy of good gods and the company of evil spirits; how the Dewas reproduced and marriage was; Adam married with Uwo (Eve?), the earth married with the sky, and the mist with the clouds and Allah gave conception to all things.

The Passumah people are a tall strong race, with well and

intelligently moulded faces; the nose with a rather prominent and straight dorsum, the eyes sunk deeply in the head, the cheek-bones projecting, but without the prominent thick lips so distinctive of the Malay face. They are very independent, somewhat surly in heart and desperately lazy people; not very friendly inclined to their neighbours in the adjoining districts. They are by no means dishonest, and live peacefully among themselves. Their children are lively and amused with little; but neither of their parents trouble themselves much about them after they are old enough to run about by themselves. They were rather afraid to allow me to submit their length and breadth to the test of the measuring-line, dreading lest the measure of their bodies should



PASSUMAH BRACELETS OF SILVER, SHOWING THE ORNAMENTATION DERIVED FROM THE YOUNG SHOOTS OF THE BAMBOO.

bear some sinister relation to the span of their existence. After giving, however, the most pacifying assurances, I found ten men and five women bold enough to risk the danger. The average height of the men was 5 feet 4·15 inches, the length of his arm 11·23 inches, and of his forearm to the tip of his longest finger 2 feet 5·1 inches, while in the women the corresponding measurements were, 5 feet 0·75 inches in stature, 11·35 inches in length of arm, and 2 feet 3·85 inches of forearm. The tallest man was 5 feet 8·25 inches, and the most herculean of the women 5 feet 2·75 inches.

The men dress as in other districts. The women, especially the maidens, are strong, well proportioned and well developed; many of them are very good-looking, having, what is rare among

the Malay races, characteristically marked red cheeks. They wear usually only one garment, a loin-cloth fastened below the breasts and reaching to the middle of the thigh. Their arms are decked from the wrist to the elbow with tiers of silver bracelets, and the lower joint of every finger with as many rings as it can hold, but they did not exhibit any delicate ideas about spoiling their lustre, and, notwithstanding the incongruity of the combination, I have often seen them grubbing up roots with their jewelled fingers, and filling baskets with earth to the clang of their bracelets.

Marriage between members of the same village or village cluster is prohibited among the Passumah people; in some districts even those of the same marga are within the bonds of consanguinity recognised by them. The two forms already described at page 151 as practised in the Lampongs I found existing here also: the one by simple purchase; the other (ambil-anak) by which the father of the bride adopts his son-in-law into his family, more as a slave, however, than as a son.* The position of the man married by the latter arrangement recalls in his utter subserviency to the woman—her property never passing to him as long as the marriage bond remains, and his children always hers—the insignificant and pitiable position of the paterfamilias among the Egyptians under the Ptolemies, in which "the woman owned all and ruled all; the man was a helpless dependant. As a child he was the property of his mother and as a married man the pensioner of his wife." †

On the day of the marriage the youth and his bride come before the Head of the village, who is as it were both king and priest. After offering to the Dewa incense of benzoin, and sprinkling over them rice yellowed with curcuma powder, he reads what may in truth be called their marriage service, a long and singular formula of great interest, called "Sawé berdūndūn," which I had the good fortune to obtain a copy of in the *rentjong* character inscribed on a bamboo. It is a

* This is really a remnant of the ancient Matriarchal System, in which descent followed in the female line. Consult "Over de Verwantschap en het Huwelijks en Erfect bij de Volken van den Indischen Archipel," by G. A. Wilkin, also Midden Sumatra, by Prof. P. J. Veth.

† *The Times*: "Buried Treasure"—Jan. 1882.

sort of invocation to all their pagan pantheon, among whom one is invoked as dwelling within the Nine Mists, to bestow their blessing on the union.

Another of their curious customs I saw performed during my stay in the village. It happened that a young girl had fallen clandestinely with child (an offence of great magnitude among them) whose father it was incumbent on the chief of the village to discover and report to the chief of his marga. A court, consisting of these two officials with the chiefs of the two neighbouring villages, was consequently called together in the Balai in which I was staying. The girl was summoned to appear, and, accompanied by her mother, she took her place on a mat before the chiefs. The head of her village, having seated himself on the ground, prostrated himself before a little incense-holder of burning benzoin, and chanted an invocation to various of their deities, concluding with—"Ye Beings who regulate the universe, make it clear whose is the fault." Then, in the midst of dead silence, he scattered over the girl some handfuls of yellowed rice-grains, and demanded the name of the partner of her crime. She replied, giving the name of some one in a distant village, and, being warned to speak the truth, she declared: "Banish me if you will, hang me if you will, kill me if you will, I can say no other—that is the truth." This finished the inquisition. Next morning a commission consisting of the chiefs who had formed the court with several armed villagers, set out, accompanied by the girl, to bring her charge against the village whose member had brought disgrace on theirs. If the person named by the girl should on his oath deny the charge, the case nowadays is carried before the magistrate of the district. In other days it was referred to the arbitrament of war or of the Dewa, who would certainly afflict the perjurer or his (or her) village; but, for the purification of the disgraced Kampong, the deity had to be invoked over a sacrificed buffalo. The woman would secretly as her time approached disappear from the village; and when, after a space, she returned she would come alone. If the person named by the girl accepted the charge, as he did in this case, and was willing by either of the modes of marriage practised among them to make her his wife, both villages,

as well as the Dewa, are supposed on his paying a small fine to be satisfied.

The people of the Passumah are pagans; but their paganism is throughout tinged in form and utterance with Mahomedanism, which in former times may have spread to a slight extent among them. They have no priests. They believe in Dewas, who inhabit the volcanoes and the deep forests, and also in the avenging power of the spirits of their forefathers if they transgress the old customs set by them. In times of difficulty and perplexity they ascend to the margin of the crater, and in the cold of that elevated spot they pass one or more nights; and once in every three years a company from the villages repairs to burn incense, and sacrifice to the Dewa some animal on the Sawah (as they name a spot just below the present cone), which must have been the floor of an old crater before the upheaval of the present one. They believe in the power of forms of words, and in the possession of spells. When a youth goes away on a journey he leaves with the object of his affections an inscribed bamboo, which she daily reads (if she is able to do so), to secure his fidelity to her and success in his undertaking; she then drinks a draught of water from it, so that the spell may amalgamate with her own self. In the roofs of their houses they secrete bamboos with various inscriptions to ward off sickness, and to cure it when it enters the dwelling. The *surat bantal*, a prayer inscribed on blades of bamboo, placed below the pillow, will insure for a mother safe delivery; and, when her infant will not cease crying, the repeating of its contents will still it. When an aged person is very sick, and cannot possibly recover, but yet lingers long at the threshold of death, they possess another formula, whose reading will release the dying spirit in peace.

The place they hold in most reverence is the grave of the *Nenè Poyang*, or stem father of the Passumah, over which their most binding oaths are taken; to perjure themselves on it would be equal to sealing their doom. If there be a dispute between two people of the same or of different villages, both retire, accompanied by their respective chiefs, to this sacred spot, where a fowl or a sheep or a buffalo, according to the gravity of the affair, is killed, which after being cut up into small pieces,

is cooked in a great pot. Then he who is to take the oath holding his hand, or a long kriss of the finest sort, over the grave-stone and over the cooked animal, says: "If such and such be not the case, may I be afflicted with the worst evils." The whole of the company then partake of the food. If the man has sworn falsely they believe that in a short time after he will be seized with some dire sickness, and will die; if he plants his fields they will not grow, or will produce barren stems; but not only will he himself be crushed by misfortune, but, in an affair of magnitude, all who were of his village who ate of the feast, if not the village also, will be overtaken by disaster. The people of Passumah Ulu Manna, which lies between the broad Passumah and the town of Manna on the sea-coast, have the same origin as those of the broad Passumah, and consequently their most solemn oath must be taken over the same grave. Now where a cause is before the magistrate, and it is necessary to swear a witness, it costs a journey of some twenty days. There has been brought, however, I am told, a stone from the grave of their ancestor to the court of the magistrate, which the people respect and swear over. One can perceive that ere long the oath of the district may be sworn over any stone, and in time to come it may be forgotten *why* they swear over a stone at all.

When a man dies his body is brought into the Balai and there laid out by the head man of the village, with various ceremonial observances, accompanied by a certain form of words, differing with, and appropriate to, each act, their ritual for the dead. Having wound a cord about the body, he takes the dead man's head between his hands, and rolls it gently from side to side; the teeth are rubbed with a piece of sapotaceous wood; the tongue is pulled forward and touched with it, the nostrils and the ears also; the eyelid is raised to permit a last look; the arm is rotated by turning the forefinger; each toe and finger is flexed; the nails are gently scraped; the juice of a lemon is squeezed over the body, which is finally sprinkled with water and wrapped in white cloth. The dead are buried without the village in a square plot—men, women, and children side by side, or they are placed in some unremembered spot quite in the wilderness. "Are they not dead? That is the end of them, and what is the good of knowing more about them."

On inquiring where the dead go, I received the following answer: "We Ulu men (living near the sources of the rivers) do not follow the custom of the sea-coast people. They say that when their people die they go to a great field, flat and without any trees, on which the hot sun pours day and night. There they have to remain day and night, roasting (*pangang*), for a long, long time, reading day and night the Korān. After a time Allah comes along with a great umbrella over him, attended by a large company. Those that have learned best he calls to walk with him in the shade of his umbrella; those

MONOLITH AT TANGERWANGI; PASSUMAH LANDS.

that have failed to learn all that they ought are beaten up in a great mortar, and sent back somewhere on earth, whence after a trial they are again transported to the baking field, where a time is allowed to them to perfect themselves, when, if they have made proper use of their opportunities they are at last called under the great shade; but if, after all these trials, they have failed to learn, they are beaten to dust in the mortar and blown away. We Ulu men do not know if this is so or not, and we wonder how they know, for we have never heard of any one who has come back to tell them. We

Ulu men do not know whither we go, but the breath that goes out of the mouth is lost two arms' length away, and we believe that we mix with the wind and follow it wherever it goes; and our bodies certainly rot away."

Some of the most interesting objects in the Passumah Lands are the sculptured figures found in so many parts of it. The greater number of these are so broken and defaced that no satisfactory result can come from their examination. They have been ascribed to Hindoo origin by at least one writer.

MONOLITH DISINTERRED BY THE AUTHOR AT TANGERWANGI.

Hearing that there existed two of these "men turned to stone" at Tangerwangi not far from my camp, I paid them a visit. I found them to be immense blocks of stone, in excellent preservation, which could certainly never have been seen by the writer to whom I refer. They are carved into a likeness of the human figure, in a posture between sitting and kneeling, but which it is not quite easy to make out from the way in which the stones are lying. Besides the two of which I had heard, I discovered by clearing the forest, first a third and then

a fourth, both prostrate on the ground in such a way as to indicate that they probably fell from the result of earthquakes; or by stones ejected from the volcano at whose base they had stood. Each figure has a groove down the back and they had apparently stood on a flat pedestal, with their backs towards one centre, with their faces more or less accurately to the cardinal points of the compass. The features of all four are of the same type of countenance; but the race now living

SIDE VIEW OF THE FACE ON ONE OF THE MONOLITHS.

in this region did not form that model, and it is equally beyond question that the Hindoo features are not represented. It is not certain that the Hindoos, who, as it is well known, settled in some parts of Sumatra at the time of their great occupation of Java about 1000 B.C. ever were in the Passumah lands; but if they ever were, there is no reason for supposing that they should depart from their wont in Java and elsewhere, and figure in their sculptures the lineaments of another race than their own. If these stones are not the work of

the Hindoos, they must have been carved by either the then people of the district or by foreign sculptors. If by Passumahers, did they depict their own features or those of another race? But who these former inhabitants of the Passumah were, whence these foreign artificers came, and for what these sculptures were used, is shrouded in deep mystery. It is quite certain also that the present inhabitants could not conceive, much less execute, such works of art.

The postures are peculiar; the figures have the appearance of persons bound, bearing burdens on their backs. The ringing on the arms, which the natives call bracelets, must be taken, I think, to represent cords, as the same marks occur also below the shoulder, where it is not the custom of the Passumahers to wear armlets. The eyes are immense and protruding to a great degree, lending weight to this idea. The sex of the persons represented is also doubtful. There is almost no tradition respecting them, beyond that they are the handiwork of *Sarung Sakti* and *Lidah Pait* (Bitter Tongue), who, wandering about the country, turned all who displeased them into stone: or that they represent the people who in the far, far back time used to inhabit this land. and who possessed tails, which the renowned ancestor of the Passumah people, Atum Bungsu, cut off. Near Pagar Alam, I saw also two stones, but quite of a different kind of sculpture; one was the representation of a woman sitting in native fashion, with an infant on her hip in the way that their children are generally carried about. Both hands support the breasts, which are apparently turgid. Her features might represent a Passumah woman. The other, distant a few yards only, is a spirited sculpture representing two children attacked by a python. The reptile is coiled about the children, one of whom has fallen, while its head is partly in its mouth. The action of the smaller boy, in thrusting off the snake with all his strength, is natural and well designed, though somewhat wanting in execution. These stones differ in character so much from the others at Tangerwangi, and have besides so little relation one to another, that it is impossible to conceive for what purpose they can have been made. The only conclusion is that a superior race, possessing considerable knowledge and refined taste, and with technical skill not possessed by the natives of any part of the island at present occupied

this region; but who they were and when they dwelt here is absolutely shrouded in oblivion.

During my stay in the Passumah lands, the news that I was an Englishman spread far, and I was several times visited by people from the Passumah Ulu Manna district, which about the year 1820 was under the rule of the English, having been annexed to the East India Company's dominions when Sir Stamford Raffles held the Lieutenant-Governorship of Bencoolen. The original document, formally recognising them as "subjects of the Honourable Company, and entitled to all the privileges of that condition," was brought to me by the grandson of one of the chiefs with whom the treaty was then concluded, carefully preserved in a bamboo case. He had heard, he said, that I was English, and he had come several days' journey to see me, for he had heard both his grandfather and his father tell of the greatness of the "orang Ingris." It was at least flattering to one's national pride to find how deep a hold their rule had taken on the gratitude of the people, when those of the third generation had come to extol to one of their countrymen their merciful and just government, and with wonderful, and of course exaggerated, tales of their liberality and of the profuseness, richness, and grandeur of the Governor's court. One old fellow came arrayed in one of his most precious heirlooms, the English-made coat, of his grandfather, of a purplish serge with steel-ring epaulets and with a curved sabre bearing King George's monogram worked on the handle. He sadly bemoaned that the present Government had not continued to him the chieftainship of his father's marga, and with the present Passirahs it was evidently a sore matter that they received no pay from the Government, when under the English rule they received seventy-five rupees a month (£75 sterling a year), a great sum to these people. I was very amused by the way one Passirah showed me his official dress. The "Company," that is, the present government, for the designation still continues—"The Company gives me *this*" ('this' with a most contemptuous curl of the lips), as he exhibited his own alongside the English uniform of his companion (the costume did not really deserve such a curl); "and I have to pay five rupees for this" (a narrow gold band on the right arm), "and five rupees for this" (its fellow on the left), "and five for this" (on the

neck). "The Ingris gave a costume like that, with a sword and seventy-five rupees a month besides!" They were always anxious to learn from me when the English were coming back again. I dare say that if the English were back, they would possibly sigh for the return of the Dutch, their supposed grievances against the dominion for the time present doubtless being always sorest. It is not all lip praise, however; there exists throughout the country a real belief in the absolute justice in word and deed of the English people and of the surpassing greatness of their nation. All the documents which they showed me that were given by Raffles to their fathers had invariably lost their wax seals, and, on asking what had become of them, the unfailing reply was:—"We have eaten them." Each document they believed was the token of rights and privileges which could never be revoked, but which would one day, though at present in abeyance, come again to them; and as the seal in their estimation is the most effectual and the potentest part of a Deed, they had eaten it; and somehow, should the writing itself get lost, the seal at any rate had become part of themselves and its potency would descend to their heirs.

CHAPTER VI.

SOJOURN IN THE POLEMBANG RESIDENCY—*continued.*

Passumah Lands *(contd.)*—The Volcano of the Dempo—Its flora and fauna—The crater—Spectre of the Broeken—The view from the summit—Leave for the Kaba Volcano—Gunung Meraksa—River journey on a raft—Lampar—Find again the spider *Ornithoscatoïdes decipiens*—Batu-pantjeh—A marriage scene—Games of the boys—Houses—Tebbing-Tinggi—Tandjong-ning—Great trees—My party attacked by a tiger—Its wiliness—Its capture—Graveyard.

The chief object of interest in the Passumah Lands is its volcano—the Dempo. Almost daily I explored some part of its vast extent, and when I left I could have profitably spent months more without exhausting its treasures. The village of Pau, in which I had my quarters, was 3500 feet above the sea. The first few hundred feet of the flanks of the mountain were appropriated by the villagers for their coffee gardens, and the few fields in which they now cultivate rice and roots. The coffee-trees, despite their being densely crowded, yielded large crops of a very superior kind of fruit; above these cultivated fields ran a broad belt of low forest consisting of a shrubbery of *Fluggea microcarpa* and the usual broad-leaved scitamineous plants, in whose damp shade balsams and white-flowered *Gesneraceæ* and hairy-leaved *Begonias* flourished. About 4000 feet began the virgin forest, which for 2000 feet upwards displayed unrivalled luxuriance, under which grew a tangled mass of shrubs and thorny climbers. Crashing through these, I one day nearly trampled on a fine new species of that curious family, the *Rafflesiaceæ*; it smelt powerfully of putrid flesh, and was infested with a crowd of flies, which followed me all the way as I carried it home, and was besides overrun with ants, notwithstanding the long hairs which protected its centre. In the deep shade at this elevation few flowers except from the climbers and epiphytes on the trees, such as many species of *Melastoma* oftener more rich in colour of fruit than of flower,

NEW SPECIES OF BRUGMANSIA, OF THE FAMILY OF THE RAFFLESIACEÆ.

scarlet *Æschynanthes*, and occasionally a gorgeous asclepiad. The varied forms and colours of the foliage, however, greatly relieved the general want of flowers. From the broad leaves of the Ginger family and the tangled thickets of palms, to the graceful fronds of *Alsophila*, *Cyathea* and creeping *Davallia*, to the pandans and aroids which embrace the tree trunks and clothe the leafless coils of the lianes, there is a perpetual and refreshing variety. Here I found a curious species of *Ficus*, whose long stem-branches penetrated underground, where the figs were produced with their orifices only above the surface.

Nothing could be finer than many of the crowns of flowers of the giant trees that I was constantly felling. One of these, a species of *Styrax* (*S. subpaniculatum*), was a mass of blossom which scented the region of the mountain for days after I felled it, and often beguiled me aside to admire even its fading beauty.

At 4800 feet I gathered the first ericaceous plants, as climbing shrubs on the tops of the highest trees; and some 500 feet higher the ground was strewed with great blossoms four to five inches in diameter, from the *Gordonia excelsa*, a giant of the *Ternstræmaceæ*, or Tea family. At 6000 feet the region of troublesome and irritating rattans and of *Pychosperma* palms was passed, and I entered a forest of more slender trees, with still many grand fern-loaded specimens among them, especially belonging to the Myrtle family as their fallen corollas indicated. At 7000 feet, near the half-way camp I had erected, a patch of tall Pandan trees occurred on the sides of a gorge, but nowhere else on the mountain. Here, flitting over the fallen logs, I stalked a pretty little brown hill-wren (*Pnoepyga pusilla*), which started on the slightest motion into a hole or crevice, and when at last wounded it took refuge in a burrow two yards long, whence it had to be dug out. This species was known before only from the Himalayas and Tenasserim till it was discovered in this island on the Padang mountains by Dr. Beccari; but my Dempo specimen was the first that had been seen in England. Besides herds of elephants, an occasional Siamang, and many tigers, mammalian life did show itself on the mountain. The long grey-beard lichens now covering the trees were an indication of the dampness of the atmosphere. Here a red-stemmed Begonia grew in the utmost luxuriance, intermingling

with a white species of honeysuckle (much visited by a fine grey-haired humble-bee (*Bombus senex*)), and which together formed a white flower-dotted field that accompanied us for more than 700 feet of ascent. At 7700 feet there was a marked decrease in the amount of flowers and fruit that the half-tree, half-shrub vegetation produced, whose foliage, I remarked, was of a more or less crisp and brittle texture. At 8000 feet my eyes were gladdened by the sight of a most lovely orchid epiphytic on the trees, which is apparently the true *Dendrobium secundum*;* its colour, which could not fail to catch the eye of the most unobservant, was of the deepest purple or mauve-pink, and its bells, suspended by a double-curved petiole of a graceful form, hung in clusters of twelve to fourteen from the tip of the stems. It is impossible of course to describe the colour, but it was of the richest tint; the whole flower was of the same colour, save one bright orange spot in the throat of the labellum. For 200 feet upwards the trees were profusely spangled with them, and it was really worth an arduous climb to see and to gather them. It is surprising to how limited an area some plants are confined. I could find no specimens of this orchid above the narrow zone I have mentioned. At 8200 feet I first gathered the beautiful Rasp (*Rubus lineatus*), which I obtained on the Malawar mountains in Java at a considerably lower elevation. On the Java mountains, from 6500 to 7000 feet, the abundance of various kinds of Rasps formed a marked feature in the vegetation; here I was struck by their almost entire absence. On the Tengamus in the Lampongs at the same height I had met with no end of *Nepenthaceæ*, and with a beautiful orchid of the genus *Cymbidium*, but here neither the one nor the other was seen; one small scrap of a pitcher was indeed brought to me from about 6500 feet, but, though I myself and my hunters searched everywhere, we could find no more. Here and there I now found small-leaved scraggy shrubs of a species of *Rhododendron* (*R. magniflorum*) bearing bright scarlet flowers, and every further foot of ascent brought us among dwarfed trees, and leaner and more scraggy shrubs, while the moss on stone and stem grew deeper and deeper. At 8600

* Not the *Dendrobium secundum* of the horticulturists, but a different and far finer species.

feet I suddenly emerged on the edge of one of the many gorges which deeply grooved the side of the mountain, and stood clear of the tall forest.

During my progress through the lower zones few insects, but some very interesting forms of birds, had been noticed. Besides the species I have mentioned above, I shot a rare grass warbler (*Suya albigularis*), previously known only from Sumatra, by one example from Acheen, in the north of the island; and twittering in low bushes a little fly-catcher, not before taken in this island—*Culicicapa ceylonensis*. At 5000 feet, hopping about on fallen logs, dodging in the low bush tangle, a black chat-thrush (*Brachypteryx atratus*) with a bright white line over the eye, fell to my gun, which was not my luck in regard to the beautiful Paradise fly-catcher (*Terpsyphone affinis*) which I saw—a pure white bird with long black-shafted tail-feathers, named by the natives *Tjabit Kapan* which signifies the white cloth in which the dead are wrapped, as they believe that he by whom it is seen has not long to live.

At 8600 feet the tall forest suddenly ceased, and among my feet I found some splended ericas of various species, the most conspicuous being that which the natives have named "Tree of the long age" (*Kayu panjang umoor*), a new species (*Vaccinium forbesii*), and one of the most handsome of its genus. It was first met with as a shrub, low and compact, but 500 feet higher it became a tree with a circumference of four feet. This, with the scarlet rhododendron already mentioned, and many species of ferns, monopolised the mountain up to 9000 feet, where I gathered, with perhaps more satisfaction still, a wee species of Gentian that expanded its blue flowers on the bare earthy banks.

To obtain the full pleasure of the climb, the day must be perfectly clear, such as the first day of May on which I made my most memorable ascent. It was one of the few absolutely rainless days of my stay. When that height was attained where the forest dwindled to a shrubbery, every foot of ascent added to the grandeur of our outlook and to the number of the peaks on peaks that came in view, along whose flanks the clouds rolled upwards in white humps and scuds, in striking contrast with the intense cobalt blue of their crests towering

against a sky of the most delicate tint of sea-green. At 9700 feet, the summit of what the natives call the Dempo was surmounted, whence I looked down into the Sawah, or ancient crater of the mountain the site of their sacred feasts and offerings, and across to the Merapi, or Firepeak, a more recent cone, now the true summit of the volcano. Here almost no insects, except annoying swarms of blue-bottle flies, were seen; but the little White-eyes (*Zosterops chlorata*) which had accompanied us all the way up, flitted about on the *Vaccinium forbesii*, their nostrils laden with its pollen, busily performing that important part in the economy of nature by which vigour is added to the plants, and size and beauty to their flowers by their cross-fertilisation.

A steep descent of 200 feet brought me to the Sawah (where I built a camp), whose dark brown and greyish-black sandy soil emitted a powerful odour of sulphur. It was dotted everywhere with clumps of heaths and rhododendrons and plants with crisp dark green leaves, and with white woolly-foliaged species of *Compositæ* characteristic of volcanic soil (*Anaphalis javanica* and *A. saxatilis*), which have a strong aromatic odour somewhat like that of camomile. An infusion of its leaves is supposed, from its sacred habitat (for it grows nowhere else on the mountain), to possess healing powers. The slope of the cone was dotted with "Long-age" whortleberry getting more and more stunted as we ascended, till, within 200 feet of the rim of the crater, it almost disappeared except as a low bush of one and a-half to two feet high. The whole face of the ascent was covered with loose stones and pieces of pumice and scoriæ.

After a puffing clamber from the Sawah we gained the rim of the crater, looking down some 300 feet of precipitous rock, on what seemed a pure white polished mirror, set in a central basin from which was slowly rising a column of steam. All was quiet and placid, and I sat down a little to take in the details of a scene so novel to me:—a vast circular basin half a mile in diameter, with rocky sides of sheer precipices, displaying at various places horizontal strata; at the bottom of this another smaller basin, some 200 feet in diameter, filled to within about 30 or 40 feet of its rim with a smoking substance, whose surface, like burnished silver, reflected the blue sky and

every passing cloud. We had sat thus for perhaps ten to twelve minutes when I noted that the centre of the white basin had become intensely black, and scored with dark streaks. This area gradually increased. By steady scrutiny with my glass, for it was difficult to make out what was silently and slowly transpiring, I at last discovered that the blackness marked the sides of a chasm that had formed in—what I now perceived the white burnished mirror to be—a lake of seething mud. The blackness increased. The lake was being engulphed! A few minutes later a dull sullen roar was heard, and I had just time to conjecture within myself whence it proceeded, when the whole lake heaved, and rose in the air for some hundreds of feet, not as if violently ejected, but with calm majestic upheaval; and then fell back on itself with an awesome roar, which reverberated round and round the vast cauldron, and echoed from rocky wall to rocky wall like the surge of an angry sea; and the immense volume of steam, let loose from its prison-house, dissipated itself into the air. The wave circles died away on the margin of the lake, which resumed its burnished face and again reflected the blue sky; and silence reigned again until the geyser had gathered force for another expiration. The roar of the coming explosion was so awesome that such of my porters who had followed me, and had never been to the top before, looked the picture of terror; and when the lake rose they took to their heels and fled in a body. Thus all day long the lake was swallowed up and vomited forth, once in every fifteen to twenty minutes. That it was not always so quiet even as now, the stones on the Sawah and the scoriæ on the sides of the cone testified. Once in about every three years, and in some decades oftener, the natives told me, the crops of coffee, bananas and rice were quite destroyed by "sulphur-rain," which covered everything for miles round the crater.

On its eastern side, where the rim rises to its highest elevation, I made a hypsometrical observation; but it required all my endurance to complete it, for, though a cold wind was blowing and the thermometer registered only 63° F., the sun's rays seemed to possess more than their ordinary power. I could feel, with acute pain, my hands, face and neck being scorched the moment they came into the sunshine. I suc-

ceeded, however, in obtaining data which enabled me to calculate the elevation to be 10,562 feet.

I walked round the greater part of the ring of the crater, searching under the stones and among the shrubs for what signs of life there might be, pausing every now and then to view the extended stretch of country spread out beneath. On the margin of the crater a butterfly, like our little Heaths, disported itself; but it always eluded my net by simply flitting over the edge; and among the Ericaceous shrubs a minute moth (*? Diopæa*), which seems able to maintain well existence, although it cannot leave its foothold on the shrubs without being dashed to the ground by the strong winds perpetually prevailing there; a few small *Carabidæ* beneath the stones, and other minute species swept from the bushes, represented the coleopterous life. Little flocks of the small green Flower-pecker (*Zosterops*) were the only birds seen or heard at the summit; but several others were obtained in the more protected Sawah, among them the Himalayan *Lusciniola fuliginiventris*.

As the sun began to decline the temperature decreased rapidly, warning us to prepare for a cold night. After I had put on triple suits of clothes, which made me feel no more than comfortable, I set about directing the preparation of a sheltered camp for the porters and other natives, who, unless ordered would take no care to protect themselves against the cold which at high elevations is so very frequently fatal to them. At sunset the temperature fell to 47·2° F. The night was perfectly clear, and the stars seemed to shine with a brilliancy almost equal to that of our own frosty skies, and to my eye certainly more clearly than I had ever seen them from the tropical plains. When at 4 o'clock next morning I went out into the Sawah, though the thermometer registered 47° F. (the lowest reading of the night was 42°) the air, which was perfectly still—its silence indeed almost overwhelming—felt absolutely free from rawness in marked contrast to what I had experienced at sunset under almost the same reading of the thermometer.

After a cup of hot coffee—at least as hot as it could be had at an elevation of 9900 feet, that is to say, not much above 194° F., we started for the summit of the cone to see the sun rise, under the guidance of one of the chiefs who had accompanied

me, picking our way in the dark over the stones and among the bushes. We had hardly set out when a dense mist began to envelop its flanks and summit, which up to this time had stood out against the sky with perfect sharpness. Before we were able to reach the crest we could see that the sun had already come up, from the lighter glow of the mist in the east; but no view anywhere, however, could be obtained. It was very cold and damp, and the thermometer did not register up to seven o'clock more than 48·50° F., and even at half-past seven it had fallen again to 45·50° F. Hoping that the mist would clear, we seated ourselves behind a rock out of the wind to watch the geyser below us; and beside one of the small enclosures, or low barricades of stone a few feet in length, which were dotted all along the ridge, the sleeping places, thus roughly sheltered from the wind, of the devotees who come to inquire of the Dewa of the mountain in times of difficulty or, as my guide said, in hope of finding near them in the morning some charm whose possession would protect them against harm or enable them to prevail over their enemies, or to attain some dear object of their desire or ambition; "but they often," he added, "experience nothing but the cold."

As the sun rose a little higher and stronger, I observed on the margin of the crater opposite to us a curious horseshoe-shaped rainbow, and for some moments I was not aware that I was witnessing a display of the *Spectre of the Brocken*. Each person's shadow thrown on the mist was surrounded by a bright halo outside which was a band of mist, and the whole enclosed in the distinct horseshoe-shaped rainbow. At length the mist entirely cleared off the mountains, and we stood gazing on a wonderful scene half land and half sea, from the highest peak within the sweep of the eye; but any attempt to convey a picture of such varied elements can be at best but mere disjointed suggestions.

Looking away south-east, the eye, passing over the plain of Passumah Ulu Manna, laid out in rice-fields in their first fresh greenness of May, and dotted with grove-environed villages, falls on the white surf of the distant ocean far to the south of the town of Manna, and follows it northward by its forest-clad margin, on which I could even discern the tide gently heaving, to beyond Bencoolen, until the meeting of

sea and sky and the peaks of the Barisan draws the view along the northward-stretching forest of mountain tops, with their shaded valleys and endless lines and curves of beauty, all of the deepest cobalt blue, deepened in hue by contrast with the cloud flocks that floated athwart their flanks and summits—pre-minent among them the ridges of Korintji. Nearer stood out the Kaba, with its smoking top; and could that sharp cone smoking on the horizon be the peak of Indrapura, with its 13,000 feet of stature three degrees of latitude away? From its sides the eye glided to the flat forest-clad plateau of Ulu-Lintang, an old inland lake-floor which lay utterly hidden beneath a great cloud-sheet spread out close down on its tree-tops, reflecting the sun like a mirror; thence to the distant verge of the broad Passumah below the mountain, void almost of trees save a few by the ravine sides and on the precipitous slopes of the gorges, over which lay fringes and patches of cloud demonstrating the attracting power of even a slight arboreal vegetation. Out of this undulating plateau, with its waste of grass, amid which its flashing *tabats* looked like glittering specks of glass scattered over it—the eye passed to the south and south-western cobalt peaks and domes of the Barisan, studded with flocky hummocks, and followed them till their summits projected themselves on the Indian Ocean at the point where the eye commenced its survey. No art could figure to the mind the light and shade, the massive sheets of colour in the wide scene; the thousand different pictures that went and came that summer's day upon the landscape's changeless out-lines. The grand yet dread thundering of the geyser at our feet, the scene of peace and mystic beauty outspread in solemn silence beneath and around us. To have to speak or to listen was an acute pain, and as distracting as a clamour of carping tongues in the midst of some sweet melody or grand outburst of music. As I grudgingly descended and the scene closed behind me I felt that this perhaps had been an audience with the Dewa of the mountain—at all events I had gained by communing with Nature from this high pedestal of hers.

My future programme included a visit to the Kaba volcano, to the sources of the River Rawas, and, if the Djambi people did not prove too hostile, an excursion into that Sultanate. As all this would at least require six months to accomplish,

I was forced to draw my tent-poles in the end of May, so as to reach Batavia in the beginning of the year 1882 in order to prepare for my long-planned expedition to the Far East of the Archipelago.

It was with the liveliest regret that I took leave of the village of Pau, where I had experienced more pleasure than in any other locality I had yet visited. The climate was simply delicious. Every forenoon, at least, was bright and sunny, and the heat was never too great to be oppressive or disagreeable, while the evenings were cool and the nights cold enough to make a blanket enjoyable. Sickness was never once thought about. Altogether, but for the difficulties of food supply and companionship I could have wished to reside there always. In its neighbourhood I had gathered numerous interesting birds and insects. I had added *Astictopterus armatus* to the fauna of Sumatra, obtained *Papilio diaphantus*, *Liminitis bockii*, and added to science *Ixias flavipennis*, and species of *Terias*, *Danais*, and *Kallima* and many of the rarest and most beautiful productions of the vegetable kingdom, especially of the giant trees and among the *Orchidaceæ* and *Rafflesiaceæ*.

Retracing my steps to Pagar Alam, I took my way north-eastward, and, crossing the Ayer Durian which has its source in the crater of the Dempo, passed out of the Passumah Lands towards the Kaba. Reaching Gunung Meraksa, in the cleft of the Right and Left Lintang rivers, I learned that I might shorten my way to Tebbing-tinggi by taking a raft journey on the river—a mode of travel I had not before tried. These rafts, made of tiers of bamboo well secured together by pegs and rattan ropes, with an elevated platform in the centre out of the reach of water, are guided by two pilots with long oars. The Lintang river was very rough and narrow, interrupted at short distances by rapids over which it required the greatest skill and knowledge of its rocks to guide us in safety. We sailed mostly between perpendicular banks of rough marls of Miocene age, against whose cliffs in many places the river, descending a stony rapid, precipitated itself, sweeping round its base at a right angle. The danger lay in the raft's not obeying the working of the steersman's long stern-paddle, and being dashed to pieces at these uncanny corners

where the sail being rather more exciting than pleasant I used to clutch my seat with a nervous grip till they were safely passed. All along the river's course every new bend presented us with varying pictures—quiet stretches of smooth black water overhung with drooping trees, scenes of village life, and green cultivated fields.

Ten miles down, the Lintang merged in the deep broad Musi, along which we glided rapidly with a delightful motion to the village of Lampar, which looked so promising a field that I was induced to pitch camp for a time there to prosecute my botanical work.

While here I found a second specimen of that curious spider (*Ornithoscatoïdes decipiens*) which I had discovered in Java. One day when my boys were procuring for me from a high tree some botanical specimens, I was rather dreamily looking on the shrubs before me during the moments of waiting, when I became conscious of my eyes resting on a leaf marked with the excreta of a bird. "How strange it is that I have never found another specimen of that curious spider I got two years ago in Java, which simulated a mark just like this!" So thinking, I plucked the leaf by its petiole, and looked half listlessly at it, mentally remarking how very cleverly that other spider had copied nature, when to my delighted surprise I found that I had actually a second specimen in my hand; but the imitation was so exquisite that I really did not perceive how matters stood for some moments. The spider never moved while I was plucking and twisting the leaf, and it was only after I placed the tip of my finger on it that I observed that it was lying on its back, when with the rapidest motion, but without any perceptible displacement of itself it flashed its falces into my flesh. I have already described the habits of this spider at page 63. It was extremely interesting to find again, evidently as a constant habit, that the thin web film had been drawn out as if to represent some of the fluid portion of the excreta arrested in a drop before it had altogether run to the margin of the sloping leaf. There is no doubt that the spider must have acquired this mimicking habit by natural selection; yet it is difficult to explain how these minutiæ, which are not constant or essential in the model, have come to be so accurately copied; one cannot believe that it would

have been a whit worse off had the copy been less minutely imitated.

In the beginning of July I packed my *Lanting* and continued my journey to Batu Pantjeh, gliding down the river by this delightful mode of travel, which enabled me, carrying my drying-paper and frames with me, to botanise all along the river-side, stopping when and where I desired.

Near this village, the country became much lower on both sides, showing that we were approaching the borders of the great alluvial plateau of Palembang. Among my excursions I suddenly came one day on a wide area, in the deep forest, overspread with coral blocks, which in some places had become solidified into more or less crystalline masses like what one sees in the basework of a coral reef. It was evident that they were standing, as left centuries ago by the seashore where they were washed through and round about by the surf; here corroded into crevices and bored by molluscs, and there excavated into deep pits, and surrounded with blocks of worn stones as if the tide had not long retreated from this old shore, to-day distant as the crow flies 200 miles from the coast. Now, however, great trees were shadowing them, and gigantic figs twining their roots among their grateful crannies; ferns clothed with graceful fronds the wasted blocks, and Begonias blossomed over them. To alter Tennyson's well-known lines:—

> There roll'd the deep where grows the tree,
> O earth, what changes hast thou seen!
> There where the forest sleeps hath been
> The shore line of the noisy sea.

I was detained here, by an injury to my foot, for many weeks much against my will, for the half pagan half Mahomedan people of the Ampat Lawang in unpleasant contrast to those of the other regions I had been among, were anything but friendly. They would neither give nor sell food of any description, except a little old rice of the worst quality. They even refused to carry my letters, so that I was unable to make known my condition to the authorities or obtain relief till I was well enough to resume my journey to complain in person, when the chief of the village was rewarded according to his deeds by the Magistrate.

The Batu Pantjeh houses are of a peculiar construction, com-

pact and picturesque, best described by saying that they are furnished in front with a broad, partly roofed verandah, fenced round by a close bamboo wickerwork, nearly concealing the inmates when standing erect, and protected by a strong door, which is reached by a stair. With their floors on the level of the verandah and their doors opening on to it, are little huts built out beyond the edge of the verandah, for cooking purposes, for keeping fowls in, for storing rice and for other conveniences, altogether forming a most convenient, commodious, and secure dwelling, below which, as usual, their store of chopped wood is kept.

One morning I was awakened by a vigorous clattering of sticks, accompanied by much laughter. On looking out I perceived that most of the rice-blocks of the village had been hauled together, and that the maidens of the place were beating on them in concert a lively tattoo for some happy occasion. As each block and each stamper produced a different note, the resulting music was by no means inharmonious. Throughout the forenoon the boys and youths, lounging in groups, indulged at intervals in bursts of cheering very like our own hurrah: "*Wooă-wooă-wōō-āā-āā!*" The jubilation was on account of a marriage which was that evening to be solemnised in the village. Next afternoon I was again surprised by peals of "Woo-a's!" proceeding from a crowd collected near the house of the newly married pair, whence shortly, amid vociferous cheering, the bridegroom appeared, wearing on his head the cap of a Vice-chief of the marga, dressed in a sarong suspended by a gold-buckled belt, his body otherwise bare save for a sash-like cloth across his chest. By his side he wore a gold-handled kriss, and carried in his right hand a be-flagged lance with its tip sheathed—the wedding staff. Over his head one of his young men held a white umbrella, another carried his siri-box, while a drum and several gongs played in advance of the procession. A little behind him came the bride weeping, in a purple silk badjo and a red petticoat worked with thread of gold, attended by all the maidens of the village, some of whom performed for her the same offices as the young men did for her husband. The processions wended their way to the river, where both the bride and the bridegroom were bathed by their respective attendants,

HOUSE IN THE VILLAGE OF BATU-PANTJEH.

after which they returned, preceded by an old female relative of the bridegroom, who spread cloths before them all the way to a spot in the centre of the village. Here a couple of mats a little distance apart, had been placed, on the one of which the bridegroom and his relatives, and on the other the bride and hers, seated themselves, each with their umbrella and siri-box before them. During the intervals of music that attended the ceremony, the youths of the bridegroom's party pelted, as if slily and clandestinely, with handfuls of yellowed rice the bride and her attendant maidens, who returned the compliment, while the fowls were enticed to pick up the grains that fell on the ground. This was supposed to be an invocation to the Dewa to bless the union and grant sufficient food, with at least a superabundance for the fowls to pick up. The old relative made various inquiries at both parties: "Will he have this woman?" "Will she have this man?" When the "I will!" had been publicly said and returned in the face of the village, she presented a lump of rice to the bride who took a bite, and the rest she placed in the mouth of the bridegroom—in token that the wife was to have the same board as her husband. After sitting for an hour or so in the face of the village, to make *brothers* with all the inhabitants, and as an advertisement of their new relations, the procession continued its way to the house of the bridegroom, where a feast was provided. The closing act of the ceremony was the removal by the husband of all his wife's ornaments and jewels, which she could never again resume unless she wished to commit that supreme crime in the eyes of her husband, of appearing to wish that she were a maiden again.

All day long the boys used to amuse themselves under my window with a game called Lepar, that interested me much partly from the rarity of games among the children, as well as from the enthusiastic manner in which they played it. Each player, furnished with a quoit-shaped disk cut out of a cocoanut shell, played forward from a stance, so as to strike either one or (according to the number of players) more disks arranged on the ground some forty or fifty feet distant. Each played in succession; his turn continuing after his first three shots, till he failed to drive his own against any of the goal disks. The

manner of propelling the disks was curious. The player, placing his shell flat on the ground, turned his back to the goal, and, firmly grasping his quoit between his heels, with a circular motion of the one leg he caused the disk to shoot forward, describing on its rim a cycloidal curve towards the goal. It was surprising with what accuracy the best players calculated the force necessary to make it describe a curve whose circumference should just pass through the disk aimed at. The players were divided into two unequal parties, the smaller being "out." As long as a player was able to strike with three tries the first goal-shell, and then the others in succession, he remained an "in"-player, and was carried back each time to the stance on the back of one of the out-players. When he failed he became an out-player, and had to deposit his shell at the goal to be played at by the others. If a disk discharged from the stance described a curve "out of bounds," one of the out-players croqueted it from the stance as far as he could, and from the spot where it came to rest the player's second stroke had to be made. They played with wonderfully good humour, and compared favourably with an equal number of boys at home. I never witnessed a case of ill-temper or sourness at losing, or quarrelling during the many days I was in the village.

I was not very fortunate, owing to my illness, in obtaining many new birds, but some of the sun-birds, which frequented the cocoa-palm flowers and the blossoms of shrubs close at hand, were of remarkable beauty, especially a species of *Cinnyris* (*C. hasselti*) with a forehead of deep metallic ultra-marine blue; its neck and back of the darkest lake, passing into green and orange on the rump, where the black wings cover it; below the wings the tail protruded, of a deep blue. Its neck and throat were of the richest scarlet, down which ran, from the angles of the jaws, two lines of the intensest blue. It was such a thing of beauty that I could scarcely dare to handle it for fear of injuring its gorgeous tinting.

From Batu Pantjeh I moved down as soon as I was able to Tebbing-Tinggi, a large village sheltering under a forest-clad hill, with a considerable Arab and Chinese population, who have good shops and carry on a large and prosperous trade with the surrounding districts. To me, who had so long been

dwelling amid the monotonous life of the mountain villages of the interior, the frequent bugle-calls, the uniformed troops, the overshadowing stone-built fortress, the shop-fronts, which seemed large in my eyes, the substantial houses, the boats on the river loading and unloading cargoes, the coolies running to and fro with goods—this gentle troubling of the pool of industry, seemed to me the very bustle of a metropolis; and as I walked down its one street to the Travellers' Bungalow, in my travel-scarred garments, great sun-hat and rough boots, I felt the bashfulness of a rustic adding to the redness of my sunburnt countenance, and as uncomfortable as if I had been planted down in similar attire in Regent Street.

In resuming my journey towards the Kaba I had to give up my late delicious mode of travel, and change the river for the road. Reaching the village of Tandjong-Ning, I found that much tree-felling was going on in the forests pertaining to it; and, hoping to enrich my herbarium, I set up my camp for a while in its Balai, a structure that might have held an army. But the village was very unsavoury, as every sort of filth and refuse from the houses was allowed to drop through the floor to the ground below. I found that my fame had reached before me, and that not particularly favourably. For some time tigers had been prowling about in the district in great numbers, and, as the Dempo is called the "Barracks of the Tigers," they had been scared from their natural home by a potent spell which I must have set up there when I ascended it. It was no use to deny the imputation—"it was well known!"

The village was prettily situated above the river Saling, which wound about below it in a deep rocky gorge, through banks which are excavated into long pools and deep pots and sparkling rapids, full of fish of fifteen different kinds (according to the enumeration of the village chief), and for which the inhabitants, who seem ardent lovers of the gentle art, angle with great assiduity and success with bamboo fishing-rods, and a line of single fibre strong as cat-gut, drawn out of the bark of a tree.

Where the felling was going on in the forest, I obtained many fine specimens, and nowhere do I recollect to have seen such enormous trees. Thickly scattered about on the ground as they were, over an area of perhaps a mile square, I failed

to realise the gigantic proportions of their prostrate trunks till I began to move about and travel along them. A human figure was lost among them. Standing by these trunks, my head often did not reach much more than to half the height of some of them, while their length of bare stem measured as much as forty or fifty yards before giving off a branch.

One afternoon, as I was returning from this forest with my men who had been felling trees, walking in line one behind the other as is their custom, a tiger suddenly slipped from the jungle bordering the road, and in a moment struck down a youth a few yards before me. I dared not fire for fear of striking the youth, but his father, who was walking just in front of him armed with a spear, dashed on it and gave it a right willing thrust, which, with the threatening group, made it quit its hold, when it sprang into the thick jungle. It was all the work of a moment; the stroke of its paw did not seem to be tremendous, but the claws of the brute had penetrated so deeply into the chest and shoulder of the youth that he survived scarcely a quarter of an hour after being carried into the village. Early next morning I was aroused by a great commotion, a loud screaming and scampering of feet, amid which I heard the word "Matjan" (tiger). Jumping up, I slid a cartridge into my Martini-Henry, and rushed out, to find every man brandishing a long spear in the one hand and a kriss in the other, all looking very scared. The tiger of the previous day had come after his unburied quarry, as they firmly believed and asserted against my doubts that he would, and had actually ventured into the middle of the village, and within thirty feet of my door which stood next to the house containing the dead body. The clamour had frightened it off into the impenetrable jungle which closely hedged round the village, whither I could follow it only a very short way.

As we re-entered the village the body of the youth was being brought out for burial amid terrible wailings of the women. It was sewed into a thick grass mat, on the top of which were spread flowers of the cocoa and pinang palms, and over which, as it was borne away, handfuls of yellowed rice were thrown. The villagers fell in behind the body, each man with a spear over his shoulder, their tips glittering in the sun like a regiment of bayonets, for fear of another sudden

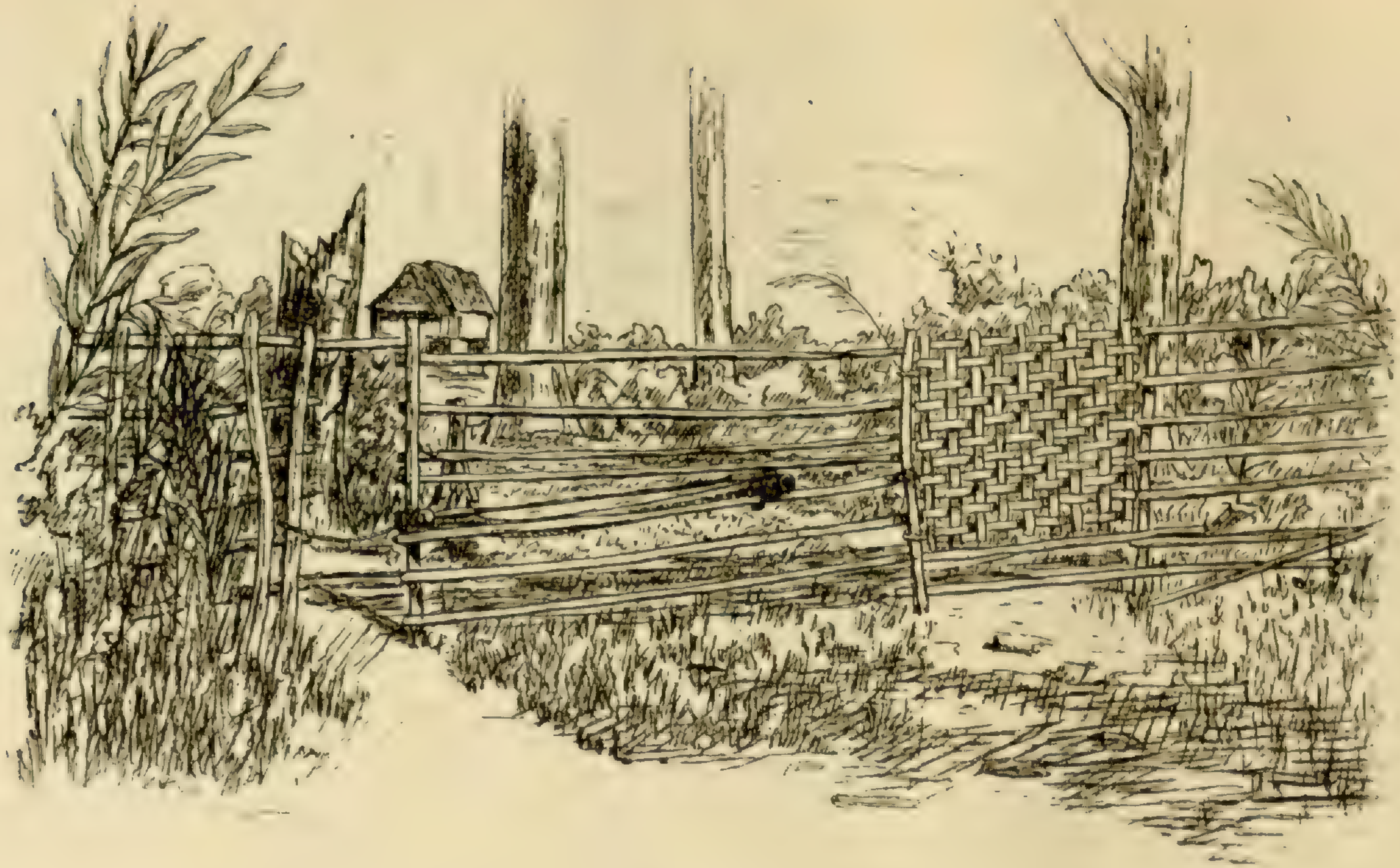
MY COLLECTOR KILLED BY A TIGER.

attack. The grave was made deeper than usual, and well protected on the top, as they affirmed that the tiger would certainly try to scrape up the body. The lamentations of the women, which were terrible to hear as the body was taken away, continued till the return of the people from the funeral, and then entirely ceased. It is difficult to learn whether these were really bitter mournings, or merely the following of their custom. The event, however, cast a visible gloom over the village, and I felt relieved when it returned to its more ordinary ways. For several nights after the funeral the father of the youth, sitting by himself alone in his house, chanted from sundown till daybreak what they call the *Tjerita bari*, or death dirge, a most plaintive lament; and to me it seemed the most saddening, woe-laden wail I had ever heard, rising and falling on the silent night like a wintry wind.

As expected, the tiger attempted to scrape up the body the night after its burial. Next night and for several others I watched the grave, but the tiger did not keep tryst with me; but when I was not there it never failed to come. I therefore assisted them to construct a snare to catch it on its first return. A fence was made at all such places as there was a possibility of approach to the grave, leaving on the cleared road a very conspicuous open gate, across which a thin cord was loosely drawn, connected with a green bamboo some thirty feet long bent by the strength of several men into a bow, at whose extremity a sharp spear was so arranged as to be shot athwart the entrance-gate, on the release of the bamboo by the tiger pressing with his breast on the twig-like cord in his way. Every night the trap was re-set for six days, without the tiger's appearance. The seventh it was left unset as apparently useless; next morning it was found that the tiger had been within the enclosure, and I saw it faithfully set in the evening. The following morning I was awakened by a great chattering outside the Balai, and, starting up to learn the cause of the uproar, I was informed that the trap had shot in the night, and the spear had been broken off, but the tiger had not been found. I was soon among the eager crowd, who had armed to beat the woods. It was evident from the blood on the spear-shaft that it was sorely wounded, and could not be far off. We had little need, however, of gun or spear, for some thirty yards in the

forest we found the warm body of the feline. Transfixed from side to side, it had cleared the high fence with one gigantic bound, and fallen dead where it lay. As soon as it was known that the body had been found, every man, woman and child hastened out of the village to see the carcase of their enemy, every individual, save the youngest children, bringing with him a knife or kriss. It was only with the very utmost difficulty that I could, by standing on the body and uttering the direst threats, prevent each of these blades from being thrust into the skin, which I wished to preserve. With what savage delight and revenge they did gloat over that carcase, and run their weapons into its body when they could! What blood there was about was all used up in dipping them in to insure bravery; and all passed their krisses broadside over and over the body to absorb the potent emanation from this personification of power and boldness. When the body was being skinned the relatives of many of those who had perished by tigers came and begged for a piece of the heart or brain, that they might revenge themselves by eating it—especially one old woman who had thus lost first her only son, and later had had her husband carried off before her eyes.

The graveyard of the village was laid out along the river, on each side of a moss-grown path, overshadowed by tall and aged trees. All about grew delicate ferns and shrubs sacred to the dead. Almost at the end of this tall avenue I came one day on a house of some dimensions, with a closed door, having a space in front cleared of vegetation, and kept neatly in order. By peering though an aperture I could see inside, surrounded by a close pavement of stones, a solitary grave-stone. This was the resting-place of the Nene Poyang, or Forefather, who had established the village. When any great trouble overtakes the village, such as many deaths from tigers, or times of scarcity befall them, they assemble here, and killing a goat or a buffalo, they invoke the good offices of the spirit of their ancestor. If a man have a dispute with another and the matter be referred to his oath, it is over the stone of their ancestor here that he swears.



TIGER-TRAP.

MY HUT AT THE HOT-SPRINGS, FOOT OF THE KABA VOLCANO.

CHAPTER VIII.

SOJOURN IN THE PALEMBANG RESIDENCY—*continued.*

Leave Tandjong-Ning — Padang Ulak-Tandjong — Kepala Tjurup — Hot springs of the Kaba — Earthquake — Botanical features — Curious plants — Fertilisation of Melastoma — A pilgrimage — The crater of the Kaba — The Nomadic Kubus — Rupit river scenery — Gold gatherers — Muara-rupit — The Durian — Surulangun — Thieves and thieves' calendars — Malay dignity — Leave for Muara Mengkulem.

LEAVING the village of Tandjong-Ning, I proceeded across a gradually-rising country, at that period very poverty-stricken, in which there was little new or interesting to detain me. Two days brought me to Padang Ulak-Tandjong, on the river Klingi, the seat ot the magistrate of the district, where I was detained for several days owing to the difficulty of obtaining transport. All the able-bodied men had left the district in search of food in far-off parts, as there had been no rice in their own, from the failure of the crops for several years. Kepala-Tjurup, the nearest village to the Kaba, was ten miles farther on, and eight from the base of the mountain. There I left the heavy baggage, and by a rough and difficult ravine-intersected path through the forest, along which I noticed not a few plants new to me, I proceeded to the hot springs at the base of the Kaba, where I built a hut amid the steam which continually rolled up from the water that bubbles out in the face of a steep ravine at a temperature of 170° F.

I had not taken up my quarters many hours before I was made sensibly aware that I was in a volcanic region by a severe and long-continued shock of earthquake. Later on, on the evening of the 16th of September, I again experienced two very strong vertical bumps, which tossed me clean upwards from my chair, dislodged a large pet Hornbill from its perch, and shook a heavy shower of drops from the trees. The Argus

pheasants screamed, and the howl of the Siamang broke the stillness of the evening. The sensation was as if an intermittent upheaval, such as I witnessed in the crater of the Dempo, had taken place under my feet.

The stream close at hand swarmed with excellent fish, of which some were caught every day for my table; the woods were full of deer, which frequented the hot springs to drink, of herds of tapir and of elegant little *Tragulidæ*. Numerous *Buceros* birds advertised their presence by their cries; in the darker shades were pittas (*P. venusta*) pheasants and species of partridge (*Caloperdix oculea*); while Babbling-thrushes (*Rhinocichla mitrata* and *Sibia simillima*), and many kinds besides, added their chorus to the woods.

The botanical features of the district were not without interest, though not so rich as some of the localities I had already visited. At my door, growing in a thicket, was one of those shrubs (*Sambucus javanica*), which like the Ponicettia, produce in the close vicinity of their florets, curious and little cups full of rich, yellow honey whose function is still a disputed question. The species of *Sambucus* in Europe, as is well known, have thread-like stipules with glandular tips, which in *S. racemosa*, M. Bonnier * has observed, produce liquid sugar abundantly. H. Müller † has recorded that a species of *Sambucus* (*S. nigra*?) is not visited by bees, but by flies, on account of its odour; but M. Bonnier says, "*S. racemosa* is visited by bees. The distribution of the nectaries . . . (according to the German physiological botanist Sachs) is always in immediate relation to the specific combinations that the flower has developed (*réalisé*) for the purpose of fertilisation by insects. They visit the flowers to imbibe the nectar, by which they are nourished, and which is distilled exclusively for this purpose." M. Bonnier holds ‡ that "the greater part of the accumulated sugar returns to the plant when the nectar loses the sugar it contained [which supervenes when the fruit begins to grow]. . . . In regard to the floral nectaries, when the sugar disappears from the nectariferous tissue, they go to

* Bonnier, "Les Nectaires," *Annales des Sciences Naturelles Botanique*, viii. 1879, pp. 1–212. For a reference to this interesting paper I am much indebted to Lord Justice Fry.

† 'Die Befruchtung der Blumen durch Insekten,' Leipzig, 1873, p. 433.

‡ *Loc. cit.* p. 199.

contribute to the nourishment of the young fruit and young ovules; and, in regard to the extrafloral nectaries, they go to the development of the neighbouring organ." The chief visitors and fertilisers of the *S. javanica* were white butterflies (*Pieridæ*); but I was unable to detect them sipping from the honey-cups; while species of wasps (*Eumenes*) that frequented them occasionally came cautiously from below to sip the nectar, but disregarded the flowers. These little cups were *not* confined to the neighbourhood of the flowers, but were arranged abundantly on the leaves and on the stems of the plant as well.

Here I was gratified to find abundance of the great Arums, *Amorphophallus titanum*, of which I have already spoken;* with tubers of a greater size than any I had seen before, some of them, indeed, being the largest yet recorded. The greatest —measuring in circumference six feet six inches, and its stem at the base two feet seven inches—formed, on its removal from the ground, a load for twelve men.

A striking feature also of the forest here was the enormous results of the activity of earth-worms. The whole surface of the ground was as rough and hummocky as a newly-ploughed field. A tube four and a half inches in circumference and eight inches high was often raised in a single night, and as, in some places, there were as many as ten to twelve of these in a square yard, it becomes evident what powerful agents they are in the fertilisation of the soil, incessant as they seem to be in their work of carrying up the soil from below and laying it down on the surface, burying the rotting *débris* of the forest. Insects were by no means common. Few bees, fewer beetles, and hardly one of the finer forms of butterflies were found except the magnificent *Ornithoptera brookeana*, whose favourite resort was the stones that cropped out above the hot water, and which were of a temperature but little below 130° F. This butterfly has a bar of the richest lake dividing the head from the thorax; its blue-black wings are banded on the upper side with the most sparkling metallic emerald, and the under sides slashed with metallic green and blue, which glittered and flashed in the sunshine, in whose brightest hours alone they made their appearance.

On the first favourable day, accompanied by one of the

* *Supra*, p. 175.

chiefs of the district, I started for the crater of the mountain. The path lay through a very gently rising stretch of forest, abounding in *Urostigma* trees, alternating with bamboo clumps, but with almost no undergrowth, except low grass and a few herbs. Where the mountain began to ascend more steeply, we entered a dense thicket of tall reedy grass and fern tangle, through which there would have been no possibility of progressing had I not sent men on several days before to make a path. So tall was the grass that merely a tunnel could be excavated in it, through which we half walked half crept, and along which the baggage was dragged only with the utmost difficulty. Above this we encountered many *Ternstrœmaceæ*, with large white and rose-coloured corollas, scented laurel (*Tetranthera citrata*) whose sweet perfume filled the air, and small trees called by the natives *Balik-sumpa*, from whose fruits necklets are made for children to wear as charms. When a youth and a maiden have plighted their troth by an oath, or indeed made any oath before their marriage, they make for their first child a necklet of the fruit of this tree, in order that no harm may overtake it on account of their oath; the name implies "Averter of the oath." Above this the mountain presented a singular appearance. With the exception of a species of Pandan, there were no more trees to be seen, only low shrubs of a pretty species of honeysuckle, which gave the mountain the appearance of being heather-clad, thickly interspersed with a taller species of pink *Melastoma* with a profusion of immense flowers nearly three inches in width, giving the landscape the appearance of being set with wild rose-trees. These fine shrubs accompanied us quite to the summit. Just about their commencement the leeches which had attacked our limbs without mercy ceased to be found; on the Dempo they drew the line at 7500 feet.

A large humble-bee (*Bombus senex*) was busy visiting these Melastoma-flowers, and I watched its operations with the greatest interest. Each flower has two forms of stamens, short and long, differing in colour and shape. The short stamens have yellow anthers, *a*, which stand out from the middle of the flower, and are very conspicuous; the longer stamens have anthers, a^2, approaching in colour to that of the petals forming their background, and are therefore less conspicious, and

they have a singular knee extended into a fork-like projection, *f*, which in the flower lies just below the bright yellow anthers of the short stamens. The lower portion of the long stamens takes a backward curve from the fork carrying the pores of its anthers far from those of the short stamens. This arrangement is most beautifully adapted, as was first pointed out by Fritz Müller, for the cross-fertilisation of the plant.

FLOWER (DIAGRAMMATIC) OF MELASTOMA, IN SECTION.—*p*, PETAL; a^1, ANTHER OF SHORT STAMENS; *f*, FORK OF LONG STAMENS; a^2, ANTHER OF LONG STAMENS; *c*, FILAMENT OF LONG ANTHER; *st*, STIGMA OF PISTIL; *s*, OVARY.

The bees invariably made for the bright yellow platform offered by the bunch of short stamens (perhaps because they do not perceive from a distance the pink pistil and long stamens projected against the pink corolla), and invariably received the pistil between their legs, their feet settling also on the adjoining fork of the long stamens. The instant effect of this is to collect the whole of the long stamens into a bunch, and to *depress* their anthers downwards and away from the body of the bee, while the stigma of the pistil (which hangs down close to the pores of the long-stamened anthers) remains in constant contact with its ventral side. At the moment of the bee's departure, the hooks on its feet, by pulling on the fork of the long stamens, raise their anthers, bringing—now that there is no fear of producing self-fertilisation of the plant—their tips in a collected bunch into contact with its sides and abdomen. Long after I had made these observations, while working in the laboratory of the Buitenzorg Gardens, Dr. Burck pointed out to me a fact of considerable importance which I was able to verify for myself, that there was in very closely allied species of this family a great difference in the shape of the pollen of the two forms of anther; that while pollen of both shapes was found on the pistil, that from the long stamens alone seemed fertile. We could not detect any pollen tubes (which are emitted when the pollen is fecundating the plant) emanating from the pollen of the short-stamened anthers.

The reason why some organ of a plant or animal has assumed, as it were, an abnormal form, is not always easy to discover;

but we may feel sure that a change of form indicates a corresponding change of function; and in discovering its true *raison d'être*, the object of our contemplation is invested with a halo of interest which it could not otherwise have possessed.

The yellow, short-stamened anthers have evidently left their ordinary function of fecundation to become an enticing food-bait to attract insects to the flower, while the long stamens have varied in form to secure to the utmost their ordinary function by insuring that their pollen shall fecundate not their own but their neighbour's stigma. This result, however, would be impossible but for the singularly methodical habits which bees have of visiting in a long sequence the same species of flowers.*

How fitly jointed together all nature hangs!

After I had progressed some distance on the morning on our way up, I became aware of two men following us who were not of our party. On inquiry I found that they were Ampat Lawang men going to the mountain to invoke the Dewa. One carried a white pigeon in a cage, and both were dressed with care in their best garments. On arrival at my hut, they adjourned along with my guide to the summit overlooking it. Here they burned benzoin incense to the Dewa, whom they should have invoked by a prayer, but as none of them could "menhadji" this part of the ceremony had perforce to be dispensed with. Thereafter they made their way to the Kaba peak, which rose on our opposite side perpendicularly out of the crater. There the two were to spend the night in the open air, and let loose their pigeon as an offering to the Dewa. I knew that they must have come on some special mission, and suspected that the younger man had perhaps set his heart on a fair maiden, and desired to impress the deity into his suit; or that they had come to solicit a good rice crop in what was then an almost famine time; or that sickness or some grave trouble oppressed them; but on inquiring of my guide the specific reason, I found that they were earnestly desirous that the Dewa might incline the heart of the magistrate of their district to grant them leave to hold—a cock-fighting tournament!

The hut of pandan mats which I had sent men to erect close

* *Cf. Nature*, vol. xxiv. p. 307; xxvi. p. 386; xxvii. p. 30.

to the summit I found placed but a few yards from the crater edge. On reaching the brink the first look quite startled me. I stood on the edge of a sheer precipice 600 or 700 feet in depth, looking down into a gigantic unevenly-floored pit bounded by perpendicular walls which till a short time previously had been a lake. The floor was of a deep blue-black colour, giving vent at various points to jets of steam. From this standpoint it seemed that there was no possible way of reaching the crater floor than by leaping over the precipice; but, on proceeding along its rim, I found a spot where the cliffs became considerably lower. This less elevated wall turned out to be only a dividing dyke separating the western from another much greater and more irregular eastern crater, into which I would not venture to descend, as, on probing its floor, it treacherously gave way under the weight of our feet. In the ugly rents and chasms athwart it, and in the great unsightly blocks of stone furiously piled up against each other in all directions, giving issue between them to steam and fœtid vapours, it was not inviting. To reach the western floor we descended a declivity of some 70°, scrambling sometimes on hands and feet sometimes sliding on our heels, not without an eerie feeling, for, though all looked still and quiet, there was a continuous and awesome sound, waxing and waning like an angry sea breaking on a shingly shore. The whole surface was covered with a layer of black sand and irregular fragments of stone, many of them of great size and weight, chipped and indented by the impact of others falling on them. The lake, which a few years before filled it, had disappeared. The soil was quite porous, and on the surface unpleasantly hot to the hand, but further down candescent enough to scorch my walking-stick thrust into it; from the whole surface vapours gently emanated, leaving variously coloured deposits. At one spot several great cauldrons were in fierce ebullition, emitting steam, with a roar like some cyclopean engine blowing off power which the walls resolved into the sound of a surf-beaten shore; and besides, vapour, sand, water, and white and rich chrome coloured muds, tinged with alum and sulphur.

Three years had elapsed since its previous eruption had ceased and six since it had commenced. Before that time it had been quiescent since about 1833. The whole country for twenty miles

round had been covered with volcanic dust, and even at the time of my visit the soil of the banks of the Klingi at fifteen miles off was so charged with noxious substances that, when portions fell in during heavy rains, numbers of fish died from its effect on the water. The mountain itself was everywhere covered with a sheet of black sand; and above the belt of grass and ferns I have mentioned, no trees had survived —everywhere their dead trunks stood erect, or lay prostrate on the bleak blasted ground. On such a gigantic scale and so proportionate is the whole scene that one fails to realise the vast dimensions of the caverns; and it is only when the eye—viewing from the summit and comparing with the littleness of a human figure the blocks of stone and the huge ejected rocks, which seem but the small atoms of which the scene is composed—pauses to estimate its vast walls and its enormous stretch from rim to rim, that some comprehension is attained of the immensity of the powers that have been at work and the effects they have produced.

In many places, extending over a wide area in an easterly direction, steam could be seen issuing from the ground; and at one spot on the crest of the Biring peak vapours were issuing from rents which must have been but a few weeks old, as the grass in their neighbourhood had not entirely disappeared, though it was brown and yellow. In many places, too, could be seen large dismal areas and mounds of black sand, ejected in recent eruptions or upbursts.

The most prominent feature of the landscape on the upper portion of the mountain was certainly the Pandans, which, though but sparsely dotted about, reared their lean ungainly stems and sparse tufted foliage prominently above the shrubs and other bushes, and, combined in the view with numerous spots blasted by volcanic action, gave a dreariness and a feeling of desolation to the scenery of the Kaba which the great beauty of the *Melastoma*, which will always remain associated with it in my recollection, could not redeem.

From the Kaba I directed my course towards the upper reaches of the Musi river; but the obtaining of transport was very difficult, as there was almost nobody but women left in the district, all the men having gone away to labour in Palembang and other centres to earn rice, which had so failed in

their own district. The poor people had sold all their saleable goods, and were then many of them living in the deep forest, feeding on fruits and green herbs, and making sago from the Areng palm; or in search of rattan and *balam* (their name for the various species of gum-elastic and gutta-percha), to exchange for rice in Palembang, whence all their supplies had to be brought—a twenty to thirty or more days' laborious pole up the river. They were besides all so very weak from spare diet that we had to arrange the baggage in small bundles and employ a larger number. Our road lay at first south-east along the Klingi, and then northward across the tributaries of the Lakitan, to the village of Suka-Radja, on the Rupit river, where I spent a few profitable weeks.

Here I obtained an interesting bird, a green species of Spider-eater—an elegant genus with long curved bill—flitting about near the ground on the rocky pavement. On dissection I found its stomach to contain, besides insects and the seeds of *Scitamineæ*, a waxy substance. The natives say that it feeds on the flowers of the *Scitamineæ* that bloom on the surface of the ground. These are most of them of very bright colours, and grow in deep shade where few insects are to be found, and it is very probable that the grateful office of cross-fertilisation is performed for them by the Spider-eater and other birds. The most remarkable feature of the forests here was an immensely tall thick tree called by the natives *Sekaurang* (? *Bassia*, sp.), whose scarlet flowers keep falling, during the two or three weeks of its blossoming time, in one incessant rain, covering the ground with a deep scarlet carpet, so deep that hundreds of bushels might be gathered, from which a peculiar and very oppressive but not disagreeable odour emanates.

Here I made my first acquaintance with the *Kubus*, a race of whom I had heard much in the southern parts of my journey as a wild tribe living houseless in the forests, covered with hair, and altogether so peculiar a people as to be famous far from their own regions. As I approached nearer to their haunts the exaggerated tales about them became reduced nearer to the bounds of truth; but still then little reliable information could be obtained; so that it was with extreme satisfaction that I learned one day that in their wanderings, a small company of them had come into the neighbourhood,

to whom I sent the head of the village to call them to speak with me.

The Kubus are a small tribe of people inhabiting the central parts of Sumatra, and it has been claimed by some for them that they are the remnants of the pristine indigenes of the country.

My first introduction was to two men, one woman, and one child; shortly afterwards, however, at Surulangun,* through the kind assistance of Mr. Kamp, the Controller of the district,

A KUBU MAN AND WOMAN, SKETCHED IN THE VILLAGE OF KOTTA-RADJA.

I was able to examine a considerable number of these people, to collect some information about them, and to obtain one cranium and, after considerable difficulty, one complete skeleton.

The Kubus are a nomadic race wandering about in the forests on the borders of the Jambi Sultanate and of the Palembang Residency, along the banks and affluents of the great rivers, the Musi and the Batang Hari. The Dutch Government some years ago began the attempt to teach these people the rudiments of the art of agriculture, and have after much

* See below, page 240.

difficulty succeeded in getting a few families in several districts to assume in some degree a settled residence in villages made for themselves. It was owing to these partially civilised communities that I am indebted for a sight of the people I met at Surulangun.

In their wild state they live in the deep forest, making temporary dwellings, if their rude shelters can be called such, in which they stay for a few days at a time, where food is obtainable, or for the purpose of collecting beeswax, dammar, and gutta-percha. Their dwellings are a few simple branches erected over a low platform to keep them from the ground, and thatched with banana- or palm-leaves. They are so timorous and shy that it is a rare circumstance for any one to see them, and of course an extremely rare one for any white man. In fact, I doubt if any white man has ever seen the uninfluenced Kubu, save as one sees the hind-quarters of a startled deer. In the small trade carried on between them and the Malay traders of the Palembang and Jambi Residencies, the transactions are performed without the one party seeing the other. The Malay trader, ascending to one of their places of rendezvous, beats a gong in a particular way to give notice of his arrival. On hearing the signal, the Kubus, bringing out what forest produce they may have collected, and depositing it on the ground at this place, hastily retire into close hiding, beating a gong as a signal that all is ready. The trader then slowly and cautiously approaches, lays down on the ground the cloth, knives, and other articles of barter he has brought, to the amount which he considers an equivalent exchange, beats a gong and in like manner disappears. The Kubus proceed then to examine the barter offered; if they think the bargain satisfactory they remove the goods, beat their gong and go away; while the trader packs up the produce he finds left lying on the ground. If the bargain is not considered by them sufficiently advantageous, they set on one side a portion of their produce, to reduce it to what they consider the value of the barter offered; and thus the affair see-saws till finally adjusted or abandoned. They are so afraid of seeing any one not of their own race that, if suddenly met or come up with in the forest, they will drop everything and flee away. They cultivate nothing for themselves, but live entirely on the products of the forest—snakes,

lizards, grubs, fruits, an occasional deer, pig, or tapir, which a happy effort has rewarded them with—and what they purchase by barter from Malays. They know nothing of art; they manufacture absolutely nothing. Their knives and the universal spear with which they are armed are purchased from the Malays with whom they trade. Neither men nor women wear clothes, except the small T-bandage of bark-cloth; some even go entirely in a state of nature. Where European influence is beginning to have its modifying effect—and where is it not now felt in some measure?—calico coverings such as modesty demands are worn. They keep in confinement a few birds occasionally, and a species of dog of moderate size generally accompanies them. They will scarcely touch water for ablutionary purposes, and have consequently a strong, unpleasant odour; and a small stream which they cannot cross by prau or by stepping-stones is often a barrier to their journey.

On approaching the steps of the hut in which I was living, my first acquaintances made a bashful salutation with the hand in the awkward way of children, advancing with open eyes full of wonder and curiosity more marked in the woman's face than in her companion's, she being evidently less accustomed to see other than her own people. They rarely come into the villages, the villagers always seeking them out in order to buy from them their forest-gathered produce. The chief who went to induce them to visit me had to assure them that I did not wish to make them take up their residence in a village, or to compel them to cultivate rice fields.

The colour of their skin was a rich olive brown; while their hair always in a dishevelled state, was jet black, inclined to curl. It was certainly less straight than that of the village Malays, but it may be that this curling is the result of want of attention, and of its becoming matted and twisted. The woman's hair was straighter than the men's. Her features were what I might call *Mongolian*, in contrast to her companion's, which I might designate as more conforming to the Malayan type about them. The child might have been a very dark-complexioned Italian or a dark Arabian. Her features are represented very truthfully on page 234. Both men had a slight moustache, and a few hairs on the chin. What struck me most in them was their extreme submissiveness, their want of inde-

pendence and will; they seemed too meek ever to act on the offensive. One cannot help feeling that they are harmless overgrown children of the woods. Within the memory of the chief of the village in which I first met these Kubus, have they only come to possess a sense of shame; formerly they knew none, and were the derision of the villagers into whose neighbourhood they might come.

Rain having fallen very heavily in the north-west hills for some time, the path across country to the borders of Djambi was rendered so impassable, that it became necessary for me to descend the Rupit to its junction with the Rawas river at Muara Rupit, and then ascend the latter by a road following the river for a great part of the way—a far longer journey. I had therefore a couple of substantial rafts made, in one of which I had fitted a covered seat, with a long raised platform behind it on which to prepare a herbarium, as the river traversed much virgin forest specimens of which my mode of travel would enable me to collect and arrange while sailing down. The river below the village was broad, and, except at a few places, of considerable depth.

I started early on the 25th of October, just as the sun was tipping the trees, streaming through the morning mist changing it into a golden haze. High overhead the pale blue of the sky betokened a bright sunny day. The morning was delightfully fresh and invigorating; even the phlegmatic Malay felt it so, for the men who piloted my rafts pranced on their poles as they shoved along, and when they came to spots where more vigorous exertion had to be put forth, they shouted and hallooed in the exuberance of their spirits. Nothing could be more pleasant than our gentle gliding down, enjoying without fatigue the ever-varying pictures presented at each bend of the river—its abrupt corners, its deep rotating frothy pools; now the shade of some stupendous tree, now the shooting an arch of some half-fallen giant busked with pendant ferns and orchidaceous Vandas. Very many trees were in flower and fruit—in fact till then for several years there had been little blossom—tall Melettias hung with immense pods, and wild Nutmeg trees with their pretty drop-like fruits. The oaks were one mass of white inflorescense, and formed a characteristic feature of the

vegetation of the banks; while bushy Sterculiaceous trees made a greater show of colour in the rich pink of their young foliage and in the bright scarlet of their fruits than in their inconspicuous flowers. Between these more outstanding trees, dark-foliaged figs and slender bamboos gracefully bending over the bank, filled up the ranks shoulder to shoulder. Tall Sialang trees, with lightning-conductor-like stairs up their white stems, by which the wild bees' nests are reached, and the Pangiums bearing 600 to 700 brown velvety fruits each several pounds in weight, so that one marvels that the branches are able to sustain the load—marked the vicinity of villages. Here and there a stately tree which had been left unmolested in their fields exhibited the grandeur of stem and crown that an Ancient of the forest can attain unto. Every lifeless stem, to the very tips of its withered arms was festooned with dark-foliaged climbers, yellow and purple *Papilionaceæ* and *Convolvulaceæ*, like the grotesque shrubbery cut out of boxwood, but with all the natural grace which is conspicuously wanting in Dutch gardens. No tree, however, was more abundant or brighter than the *Lagerstræmia*, whose fine red tops could be seen a long way off. Every now and then a creaking sound came up the water catching the ear like the subdued screech of a buffalo cart, produced by the monotonous turning of a large bamboo waterwheel fixed where the banks of the river were high, to lift water into the adjacent rice-fields by bamboo buckets fixed at intervals in a lateral direction to their paddles. Water birds of many species, and kingfishers in cobalt plumage, were constantly darting about, roused from their hunting grounds by our passing, many of which were hononred with a place in my collection. In addition to the ever-changing forms of the vegetation and the varied bird and insect life that flitted from side to side, there was no lack of human interest in the scenes. Now it was a skiff with flashing oars with a chattering load of women and girls with their baskets on their way to the fields; now a village crowd in their many coloured sarongs, clustered on the rocks or under the shade of some broad fig to see our flotilla pass by; here it was a patient plyer of the gentle art by a rippling bend; there a crowd of women in a shingly corner in their broad sun hats and blue gowns washing the sand for gold.

The recent rains had produced a flood—the greatest, it was said, for five years—which had risen from ten to twelve feet above its ordinary mark. Throughout a distance of from thirty to forty miles it had carried away pieces of the bank from three to five yards wide and from eight to ten feet deep. In these new sections large trees (stems and branches) had become exposed, buried more than six feet below the surface of the surrounding land. These sections showed the soil resting on a deep band of clay, which in turn was lying on a thick stratum of shingle, which was being again washed out, to be subjected to fresh attrition after having rested for many cycles. Below the confluence of the River Tiku, which rises among the Palæozoic rocks in the Redjang region a considerable quantity of gold is found when the river is very low, caught among the stones, larger pebbles and sand. This sand is collected—the occupation mostly of the older women—and, when freed from the larger particles, goes by the name of *bungin;* the bungin is washed in a broad cone-shaped vessel of wood—the *dulang* —by a rotatory motion, till only an extremely fine heavy black sand (*kalam*) is left. The kalam, which contains the gold is then rotated in the dulang with a little water till the heavier metal falls to the apex of the cone, whence it is carefully removed. A very successful day's washing in this fashion will bring only 1*s.* 8*d.*

With a halt of one night at the village of Ambatjang, so called from an old large and symmetrical tree of that name (*Mangifera fœtida*) growing in the village, then in magnificent blossom, I reached Muara-Rupit at the confluence of the Rawas river, on the afternoon of the second day. Muara-Rupit, to the Ulu men from among whom I had come, is a great place which perhaps some day fate may permit them to visit. To have been to Muara-Rupit from the Ulu country is to have gained a certain precedence amongst their fellow villagers, while to have been to Palembang, a to-and-fro journey of six weeks, is to have seen the world! This place is the seat of a great trade; everything from the coast for the Rupit and the country watered by its tributaries, and for the Rawas and its tributaries up to the Djambi country, is brought to Muara-Rupit, whither can come a small steamer able to carry a company of troops. I was consequently not surprised

on finding a broad, deep river, with a fleet of Palembang praus at anchor, and of rakits loaded, or lying to be filled up with gutta-percha, rattan, and buffaloes for the Palembang market.

From Muara-Rupit I proceeded to Surulangun, along a good road following the Rawas river, under a continuous shade of tall Durian trees from thirty-five to forty feet high—a growth of ten years. The road was carpeted throughout its length with their flowers, which were dropping off in vast numbers. In the flowering time it was a most pleasant shady road; but later in the season the chance of a fruit now and then descending on one's head would be less agreeable.* At every village I passed, I was respectfully received by the chiefs; and at several places they were accompanied by the youths and maidens, who were formed to right and left of the way attended by a band, while a table loaded with fruits, sweetmeats and coffee, barred the road, of which in order to gratify them I had to dismount and partake. This band played me to the boundaries of the next village, where another was waiting to convoy us through their region.

At Surulangun, the residence of Mr. Kamp the genial Magistrate of the district, enjoying his bountiful hospitality, and the companionship of the commandant of a small garrison quartered there for the protection of the district against the Djambi people, several most pleasant days were passed. These hostile neighbours make not infrequent raids on the villages to carry off their herds, covering their departure by maliciously planting the roads with short sharp bamboo spikes, invisible till wounds are received.

Here I had the satisfaction of again examining, through Mr. Kamp's kind aid, a considerable assemblage of Kubus of both sexes. Several of them it would have been impossible to tell from the people of the surrounding villages from their features; on the other hand, there were peculiarities scarcely reducible to words, by which they could have been picked out among a crowd of Malays. I tried to formulate the differences, but found myself almost unable to say exactly wherein they consisted. The high (between the eyes) straight dorsum of the

* Of this fruit the natives are passionately fond; and Mr. Wallace writes it is worth a voyage to the East to taste; and the elephants flock to its shade in the fruiting time; but, more singular still, the tiger is said to devour it with avidity.

nose in a few was remarkable; and the sharply prominent cheek-bones. The villagers asserted that they could tell a footprint in the mud of a Kubu from that of their own people. I caused several of them to walk over sheets of paper after rubbing the soles of their feet with soot, but I could not discover, either in the shape of the foot or in its print, any divergence from that of the people about them. The lips of the Kubus were thin, and the eyes restless and glancing, as if ever on the alert. The average height of seven males was 1·59 metres, and of five females 1·49 metres, which is about the average stature of the Malays of Malacca. On comparing the impress of their hands with those of the people of the district, those of the Kubus I found to be smaller. They are, I also observed, rather subject to reduplication of the fingers.

They are said to have a language of their own unintelligible to their neighbours, but I failed to induce them to give me any specimen of it, if it existed. I could not understand their speech at first; but after some conversation I could detect that they really spoke a corrupted Malay with a peculiar accentuation.

Monogamy is the rule among them; but a few have two or more wives. Their nuptial ceremony is a very simple affair. The man having fixed his choice on a girl, and obtained the consent of her parents to his suit, brings to her father such gifts as he has—a knife, a spear, cloths, or money (if he has any), dammar, and beeswax—and such rare fruits of the forest or favourite food-animals as may reward his search. When this gift is satisfactorily large, those who may be within reach are called together. Seating themselves below a tree, the father of the maiden informs them that he has given his daughter So-and-so to So-and-so in marriage. One of the company then strikes the tree under which they sit several times with a club, proclaiming them to be man and wife. The ceremony is followed by such feast as can be provided, principally out of the fruits and animals the bridegroom has paid for his wife with.

It is a rare thing for a Malay man to marry a Kubu woman; but it occasionally happens, notwithstanding that they consider the Kubus far their inferiors, a position which the latter seem to accept with very marked submissiveness. "You Kubu!"

is a term of opprobrium which I have often heard applied by one native to another with whom he had quarrelled. The village people consider them little other than beasts. In no case will a Malay touch or interfere with a dead body of one of his people; yet I was able to obtain their assistance in disinterring the body of the Kubu from which I made the skeleton that I obtained. The Kubus possess no personal property of any kind beyond what they can carry about with them. Their food, which consists for the most part of wild fruits or small animals, which they prefer, I am told, in a semi-putrid condition, they eat as they come by it, with little or no cooking. When traversing the forest, if one of them, on finding a bee-infested or a dammar-yielding tree, clear the brush around it, make one or two hacks in the bark, and repeat a form of spell, it is recognised by the others as his possession, which will be undisputed. This is the only property, if such it may be called, that they possess.

They are extremely fond of tobacco. Before one of them, who had seated himself on the edge of the verandah, I produced some of the coveted weed. It was a study to see how his face gleamed over, and his eyes followed the parcel with the eagerness of a dog's after a bone with which he is tempted. To try him, a handful of very poor quality was offered him, which he snatched at, but, after smelling and tasting it, he rejected it with a sneer just as a monkey might have done, fixing his eyes eagerly once more on the bundle first produced. Some of this was handed to him, the whole of which, after smelling, he rolled into a thick cigarette in a leaf, and smoked with prodigious mouthfuls in perfect and delighted silence. When he saw or was offered anything which he liked particularly, his eyes sparkled, and he expressed his eagerness by the continued repetition of a peculiar sound, "*S–s–hō–ō!* *S–s–hō–ō!*" Some fruit and a large plateful of rice, offered to him, were devoured more in the ravenous manner of a beast than of a man. When he had finished it he rubbed his stomach, to judge by its rotundity if he had had sufficient.

Their intelligence is not, however, to be called of a low order. They evince considerable dexterity in the use of their spears, and are wonderfully accurate marksmen with stones. They post themselves behind some tree, in front of which is another

wherein birds are lodged, and thence discharge the stone over the one that hides them, so as to drop on the bird in the other. When sick they use various leaves from which they make decoctions; but their curative pharmacopœia is very limited. I could not discover that they knew many poisons, but they were best acquainted with such plants as possessed aphrodisiac qualities, or were able to cause abortion.

In their truly wild state they leave their dead unburied in the spot where they died, giving the place ever after a wide berth; but where the influence of the village customs has begun to affect them, the body is now generally buried face downward, with a strip of bark below and above the body. They seem to have no idea of a state after death: "When we are dead, we are dead."

They have a tradition that they are the descendants of the younger of three brothers: the two elder were circumcised in the usual way: the younger it was found no instruments would circumcise, a circumstance which so ashamed him that he betook himself to the woods to live, and "We are his descendants," they told me.

Leading so nomadic a life, the jurisdiction that can be exercised by any one over them can be but very slight. Such as it is, it is wielded by the elders of the party, who settle disputes that arise between man and man, and impose punishments for offences.

It will be seen that the Kubus differ much in their habits and ways of life from those about them; but whether they are the last survivors of their race, or are only a straggling remnant, kin to those about them, who at some past time were driven from below the family rooftree to save their lives in the forest fastness, and who, even when persecution has ceased, yet cling to the shade of those pillars which in their need afforded them the kindly refuge they sought, are questions on which the osteological evidence must be appealed to. Dr. Garson finds that the antero-posterior length in comparison to the transverse breadth of the brim in my Kubu woman's pelvis is extreme; "indeed I have never," he remarks, "seen or measured a pelvis of so exaggerated a type, approaching in form nearly to that of the anthropomorphous apes; the great antero-posterior length of this specimen is due chiefly to the straight-

ness of the sacrum. The index also obtained by comparison of the upper and lower limbs with each other is 70 (the latter being taken as 100). This high index shows an approximation in the proportions of the limbs of the Kubus to those of the anthropoid apes, and indicates that the length of the upper limb is considerably greater in proportion than that of the lower as compared to what obtains in Europeans. In the Negro and the Andamanese, on the other hand, the upper limb is proportionately to the lower shorter than in Europeans.

"Unfortunately the number of Kubu skulls obtained is not

A KUBU MAN, AND WOMAN, SKETCHED IN THE VILLAGE OF SURULANGUN.

sufficiently large to justify very definite statements regarding them, though I think sufficient to answer one question which presents itself to us for solution, namely, as to what race the Kubus are allied—whether they possess Negrito or Malayan affinities. The character of the hair, the form of the nose, the various characters of the skull, and the proportion of the limb-bones show that they cannot have any near affinity to the Negrito race found in various parts of the Indo-Malayan Archipelago, but that they are decidedly Malays, and therefore Mongoloid. The high nasi-malar angle, the high and broad

face, the flat forehead, owing to absence of all glabellar and superciliary ridges, the slight sub-glabellar nasal depressions, and the nomadic life they lead, are all highly characteristic of the Mongolian race.

"The frizzle in the hair seen in the drawings on pages 234 and 244 is probably to be accounted for by their having at some remote period intermingled slightly with the Negrito people, possibly during their migration southward. There is, however, evidence that they have for a long period been isolated from the other surrounding inhabitants of the island, and that by absence of infusion of fresh blood they have come to resemble one another so closely that they now possess certain definite characteristics of a more or less stable nature."

From the prison the Magistrate brought a thief who was waiting to be sentenced, on whom on his apprehension there had been found a bag with the chief paraphernalia of his trade, in order that he might explain to me their use. In it was a bunch of keys of various sizes, a little sack with rice-grains for alluring fowls; a package of arsenic for more subtle bipeds; a tube of soporific powder, whose recipe he was confiding enough to give me: Take of the *Gadung* (a species of Arum whose uncooked roots induce a sort of intoxication) a few scrapings of the skin where the stem joins the tuber; of white *Katjubung* (*Datura*) the seeds of seven fruits; the excreta of seven mice; of arsenic a sufficient quantity. When dried, pounded, and sifted through a cloth, to be thrown on the rice, or into the cigarette of the victim, or to be blown towards him as occasion offers. The thief admitted that he had tried its effects and produced sleep on two men, and stolen from them many cloths and gold dust to the value of several hundred rupees. In addition to the somniferous compound there were two other tubes of "medicine," one for curing pain in the stomach, the other a bright scarlet substance like vermilion which was a deadly poison, he said, producing vomiting of blood, followed by a terrible and incurable cough, if death did not at once supervene. Its composition he did not know; he had bought it in the Djambi country. In order, however, that its virtue should not be lost it required to be set near the heart of a buffalo or of a fowl at frequent intervals. It had besides the valuable characteristic of preventing any harm from poison to

the person who carried it about with him. The bag contained, besides, three calendars of different forms—the thief's ephemeris—for computing the day and hour at which success or failure would follow the enterprises of his interesting and exciting profession.

The people of the Rawas are of more open, lively and enlightened character than those I had anywhere encountered. The women had less of the bashful and timid disposition of Malays of their sex, and were inclined to be talkative and gay, without forwardness or want of respect—altogether a more likeable people than any other in the Residency.

During my stay at Surulangun there occurred one of the high Moslem feast-days, on which it is a custom of the chiefs to come to express—"inasmuch as it is a day of congratulation among ourselves"—their good-will and wishes towards the Government and the person of the Magistrate. Accordingly the chiefs of the nearer villages, along with a large company, attired in their best, came to the residence of Mr. Kamp, who (attended by the Commandant and myself) received them in the verandah on to which they filed, with a respectful salaam, to a seat in Oriental fashion. After a few minutes, to allow every one to become still, the chief of the marga rose; and I shall not soon forget the grace and dignity of his manner and bearing and his perfect self-possession and composure. Making a distinct and separate bow first to the Magistrate (the ruler of the region and representative of the Government), next to myself (the stranger and his guest) and then to the military Commandant—the order which the etiquette of the occasion made very proper, and most becoming—he made a long speech to the Magistrate perfect both in expression and in courtly demeanour, and then addressed us in turn. The phrases made use of—many of them, in the Malay language, extremely terse—to express their own goodwill to the Government were loyal, honourably submissive and hearty, and those in which they acknowledged the benefits of good government, and the just and mild administration of the Magistrate himself, were most courtly and affectionate. To myself terms, aptly chosen, were used to signify their pleasure at my visit to their country, their sincere wishes that I might enjoy it, and the assurances of their utmost hospitality and good-will. The

words addressed to the Commandant were very appropriate to the commission he held in the district. Altogether it was a specimen of the Malay at his best, as a courtier and a gentleman; and (to me) a most interesting exhibition of the elegance, the politeness and dignity, which are characteristic of their race.

The dances in vogue are, like themselves, quite different from those in other districts; they are of several forms, are more lively and are danced with much spirit, some of them having a likeness to European performances, especially one where the dancer in her evolutions balances on her head, shoulders and hands lighted tapers, reminding one of the German Hugel-hupftanz.

FIG. 1.

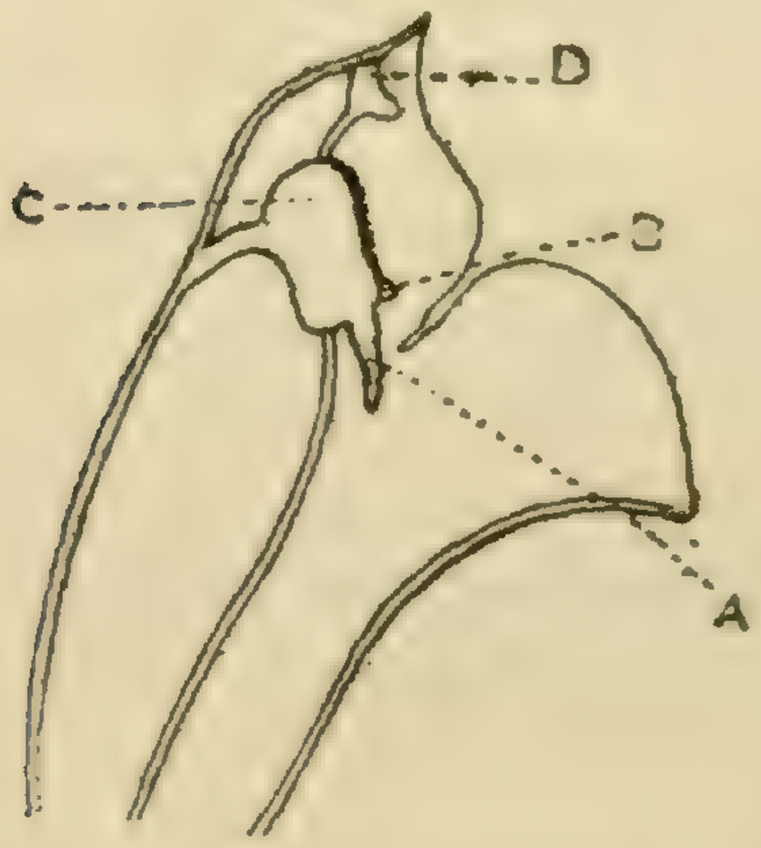
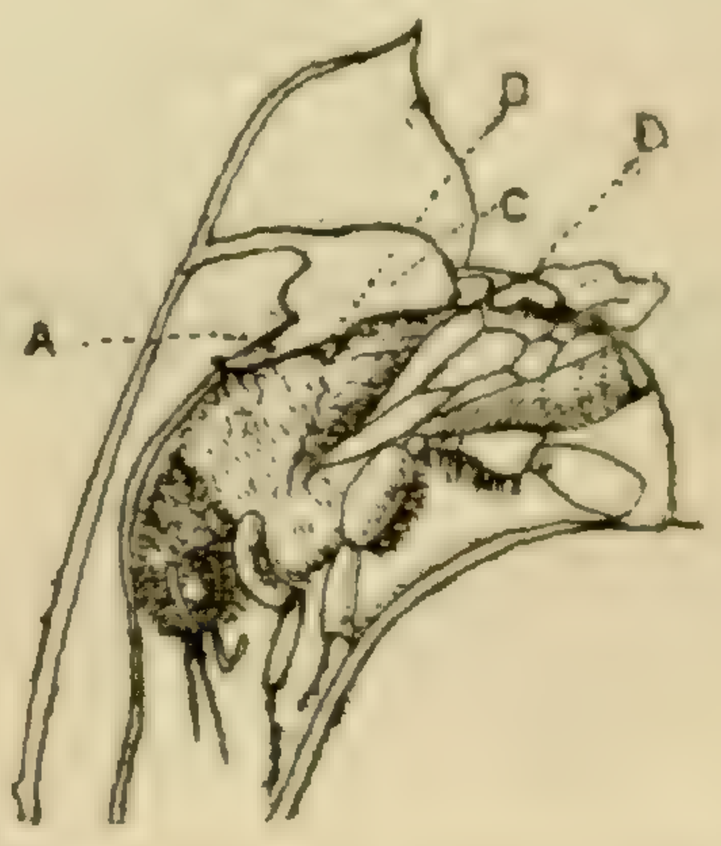


FIG. 2.



FLOWER OF CURCUMA ZERUMBET.—A, PROCESS OF THE ANTHER; B, TUBERCLE OF THE ANTHER; C, ANTHER; D, THE STIGMA. FIG. 1, THE FLOWER SHOWING ITS ORGANS IN THEIR NORMAL CONDITION; FIG. 2, WHEN BEING VISITED BY A BOMBUS.

The region about Surulangun is one of great interest, as it lies on the borders of that little-known forest stretching towards Redjang and Djambi. Among the birds found here I obtained the *Palæornis longicauda*, with its metallic-green crown, pink head and black-ringed neck, one of the most chastely-coloured of the parrots. They used to collect in the highest trees in the neighbourhood, and were exceedingly difficult to shoot. In a tree near to that occupied by the parrots a species of bee-eater (*Merops sumatranus*) flocked in such thousands that as they congregated in the evenings they seemed like swarms of bees, and the hum of their wings could be heard a long way off. By the roads here were some magnificent fig-trees and *Dipterocarpeæ*. In the low forest a common species of the Ginger

family (*Curcuma zerumbet*) abounded; but in gathering it, I observed that it was provided with one of the many contrivances for securing cross-fertilisation which are so interesting to the botanist, and give such intense pleasure to his contemplation of even the commonest flowers. The flower-stem terminates in a head of rich pink leaf-like organs called spathes, which supply a brilliant alluring mass of colour to the rather inconspicuous, odourless, though largish white flowers; the pistil, or organ for receiving the fructifying pollen from the stamens, passes through a hole in the conjoint anther, and its head is protected by a hood in the perianth from all insects and intruders which are not large enough to convey its pollen to another flower. When, however, there enters a bee or other insect large enough to fill the mouth of the flower, it comes in contact with the processes *a*, projecting from the lower margin of the compound anther, which act precisely as a lever, for when these are pushed backward by the bee pressing in, in quest of the nectar at the bottom of the flower, the anther is rotated, carrying with it the stigma or top of the pistil on to the back of the insect in the most beautiful manner. A bee that presses the long appendages of the anther, may rotate down the anther so as to carry away pollen on its back, but it will not fertilise the flower unless it is large enough to rotate the composite anther sufficiently far to bring the little tubercles, *b*, also on to its back, the pressure of which alone rotates the pistil tip on to the bee's back. It is evident that the pistil can never come into contact with the pollen of its own floret, nor can any floret be fertilised unless the insect has entered fully into a former flower, and smeared its back with a patch of pollen of some length, as long at least as the interval between the anther appendages and the pistil.

As the fertilising insect even begins to back out the lever apparatus is instantly released, and the summit of the pistil completely returns into the security of its hood.

When once fertilised the stamens thicken in their central part and, contracting in a corkscrew fashion, draw the perianth with the stamens and pistil to the bottom of the spathe out of harm's way and to make room for the next floret. Mr. Darwin has drawn attention to the likeness of the *Scitamineæ* in the relation of their essential organs to those of the *Orchidaceæ*, and

few examples perhaps could exhibit this similarity more than the one under notice; its pollen moreover being less friable than that in most species of its family, and singularly viscid.

I could have spent many months investigating the natural history of this district, but, time being short, I pressed on to reach Muara Mengkulem, whence I hoped to be able to make an expedition into the Djambi Lands. Using his great influence with its chiefs, the Pangeran of the Rawas might be able to obtain entrance for a white man not a Hollander, of whose entrance the Sultan was naturally extremely jealous and afraid. From Surulangun the road kept by the north side of the Rawas river, to the halfway village of Pulau Kida, near which is the boundary between the diluvium of recent age and the Palæozoic strata, which, extending away north-west to Limun, contains the auriferous rocks which have made that country famous for the quality and colour of its gold. I passed many people washing the earth of the high banks of the river; and at a spot some sixty feet above its present bed, opposite where it is obstructed by a cataract a mile and a half in length, I saw an ancient mine of the natives. Late in the afternoon we reached Muara Mengkulem.

CHAPTER VIII.

SOJOURN IN THE PALEMBANG RESIDENCY—*continued.*

Muara Mengkulem—Refused entrance into the Djambi Sultanate—Napal Litjin—Peak of Karang-nata—Geological formation—Botanical features—Birds—Hemipteron milked by ants—Rakit life—Bigin-telok—Water roads—An escape from drowning—Pau—River squall—Approach to Palembang—River life and its massive joy—The town of Palembang—Return to Batavia.

On arriving at Muara Mengkulem I was bitterly disappointed to hear from the Pangeran that he considered it extremely improbable that the Panghulus of Djambi (all the chiefs of the villages in Djambi are priests, the people being bigoted Mahomedans) would consent to my traversing their country, as there was a great deal of fighting going on in the interior. He, however, consented to send a messenger to those among them who were his friends at Bukit-bulan five miles distant, explaining who I was and for what object I wished to visit their country, to which after an interval of some days a reply was brought, that though personally favourable to me they could not be surety for my safety, and advised me not to attempt to enter without the mandate of the Sultan, meaning not the Sultan recognised by the Dutch Government, but the previous deposed ruler, who had taken up his court in the interior of the country and whom all the Djambi people recognised. This was very disappointing, but I had fared no worse than the Dutch Mid-Sumatra expedition, which, two years before, had been advised to turn back at that same place. I proceeded a stage still farther up the river to Napal Litjin, my farthest northern station, a very picturesque village at the foot of another of those nearly perpendicular limestone peaks of which I have made mention more than once, as lying on the eastern outskirts of the Barisan range.

The ascent of the Karang-nata, as the principal peak is called, was by no means easy, as its white cliffs—which from below glinted prettily through the vegetation—were almost perpendicular, and had to be scrambled up by digging one's fingers and toes well into the crevices. It has several caves full of stalactites, one especially being of great dimensions, whose numerous chambers were tenanted by thousands of bats, whose stifling guano-like odour met me half-way down. The hill is composed of a broad band of crystalline limestone bedded between Devonian slates tilted up on edge, which at the base of the hill run under the diluvium of the Palembang Plain. The larger cave is in its interior quite protected from the severe effects of the weather, but it bears evident traces of what must, I think, be attributed to sea erosion. The summit is a vast rockery of disjointed blocks, with trees growing in the crevices, their stems, as well as the crannies and faces of the rocks, loaded with ferns and orchids (*Cælogyne*, spp.) bearing trosses of flowers more than a yard in length; with various species of *Melastoma* exhibiting bright flowers or pink fruits, but principally with a shrubby species, in great profusion, of *Cyrtandreæ*, having a flower of a rich purple-blue colour, which to my great satisfaction I perceived to belong to a new species, which I have named *Boea Treubii*,* and probably to a new genus of that beautiful family. During the ten days—to my regret all the time I could spare—of my stay in this region I made large additions—some 200 species—to my herbarium among the specimens of trees, one being a species of nutmeg with fruit as large as the largest orange.

Here, too, I noticed a singular case of ants milking a winged Hemipteron, which of course could not be kept in captivity, as they do many species of the wingless aphides. The Hemipteron sat quietly, evidently enjoying the operation, and at frequent intervals discharged a drop of matter, which was eagerly sipped up by the ants.

I have already spoken of the great beauty of the riverside vegetation coming down the Rupit which ran through a less great forest than that between Napal Litjin and Muara

* So named in honour of Dr. Melchior Treub, the esteemed Director of the Botanical Gardens in Buitenzorg, to whose kind aid and influence I owed much during my stay in the Archipelago.

Mengkulem, which is perfectly virgin and is perhaps of as vast an age as the period which has elapsed since the beginning of the upraising of the 180 miles of country that now separates it from the sea. The display of flower and fruit along the Rawas river was still finer, and, in fact, it could scarcely have been richer. While Oak-trees in full blossom characterised the Rupit, *Dipterocarpeæ*, the family which gives us the Camphor-tree and supplies a great deal of the dammar of commerce, and some of which are among the tallest of trees, were along the Rawas the distinguishing feature—though clumps of oak were plentiful enough too—the brilliant pink and rose coloured "wings" that adorn their ripening fruits having the appearance of tassels hanging from the tips of the branches all over their immense crowns. Over some of the highest trees, and spread continuously across the forest for hundreds of yards at a stretch, was a Leguminose climber (*Bauhinia*) with rich orange and scarlet flowers. Blue fishing-hawks (*Poliætus humilis*) sat in motionless watch on the projecting limbs of trees; Rhinoceros birds (*Anthracoceros convexus* and *Rhytidoceros subruficollis*) clambered on the fruit-laden fig-trees, conspicuous by the rich colour of their beaks —derived from the oil-gland at the tail in *B. rhinoceros*. Herons and Bitterns hunted in the sandy bends, kingfishers flew out from every corner, and flocks of sand-plovers zig-zagged away with a-frightened scream as we passed along; while on the projecting stones on the river, black cormorants (*Phalocracoraæ*) eagerly watched for their finny prey, and flocks of pure white egrets displayed to advantage their spot-less plumage against the dark foliage of the tops of the trees.

On my return to Muara Mengkulem, I had at once to prepare to start for the coast. While I was packing up I sent down men to Pulau-kida, the village below the cataract, to construct for me a Rakit in which to travel to Palembang. In these large house-like structures—floated on bamboo rafts—the whole produce of the up regions of the river are conveyed to the coast markets. Mine, however, while resembling the trade Rakit in appearance, was fitted up with much regard to comfort, for I intended the remainder of my Sumatra journey to be a pleasure trip. On a raft 40 feet long and 15 wide, made of the largest bamboos seven or eight tiers deep, was erected a neat house, sur-

rounded on all sides by a platform under the shade of the roof. I divided it into a writing room and sleeping chamber in front, and a store for my collections and a dormitory for my servants behind. Behind this was another long raft slightly narrower, floored with earth on which a trellis frame-work stood, and the whole housed over. On this earthen floor a fire was continually kept burning to dry the bundles of herbarium laid on the trellis-work over it.

I had looked forward with intensest pleasure to this mode of travel, and it was therefore with extreme satisfaction that, on the 27th of November, 1881, I arrived from Muara Mengkulem and took possession of my floating home. Inside, I lined my sitting-room with white cotton cloth, hung a few drawings, photographs, and trophies about the walls, fixed my table, and laid out my books and the implements of my profession. The outside I hung round profusely with living orchids, some of them in magnificent flower. Next morning, full of the most buoyant feelings, I loosed its cable and let it glide off down the Rawas River, along a great avenue broken at distant intervals only by gambir gardens and factories of Catechu.

All the villages along the river had been informed of my coming, and on notifying my approach by the beating of a gong, a complement of rowers—more properly of pilots—came off in small boats and relieved their fellows of the village above. In the upper reaches of the river it required 16 pilots to guide this long flotilla—whose duty it was to keep the stern of the Rakit straight to the stream especially at corners and rapids, by pulling on long fixed lever-like oars at stem and stern, which they worked standing. All day long I collected plants from the river banks, by means of a light skiff, as the stream moved very slowly, anchoring each night under some great tree by the margin.

After a seven days' journey I halted for a more prolonged stay at the village of Bigin-telok, to make some closer acquaintance with the flora of the flatter lands which began there. It was then the wet season, and the surrounding country was under water for miles from the river bank, and botanising from a boat was a curious experience; for after entering some side stream a little way, all distinction of stream or no stream was lost, and I could simply sail about among

the trees in any direction I wished, but such work required the attendance of a good guide. Jambus (*Jambosa* spp.) seemed to be among the most common trees, and their long white stamened flowers, falling on the water, glided down the stream like so many stars. The whole surface of the water was covered, absolutely in a close sheet, with petals, fruits and leaves, of innumerable species. In placid corners sometimes I noted a collected mass nearly half a foot deep, among which, on examination, I could scarcely find a leaf that was perfect, or that remained attached to its rightful neighbour, so that were they to become imbedded in some soft muddy spot, and in after ages to reappear in fossil form, they would afford a few difficult puzzles to the Palæontologist, both to separate and to put together.

In many of these places the water reached to the great depth of 60 and 70 feet, and swarmed with crocodiles. While shooting one day on such a spot, from a small skiff capable of holding only myself and the man who oared it, I fired at a bird among some stranded logs, and the recoil of my gun, perched as I was on the tip of the prau, overbalanced me into the water. Had not at the moment of falling my left hand unconsciously caught the side of the boat, I should have fared ill, for I had instinctively clutched my fowling-piece, and was besides wearing a pair of heavy shooting boots. My weight on the side would have capsized the skiff had not my rower righted it by a self-preservatory act, which drew my head out of the water, when I scrambled into the boat. The poor fellow was utterly paralysed with terror, and presented so comical a countenance that I could not help laughing at him. He would scarcely allow me to move again in the boat, and had I not used threats, he would have paddled me back to the village without waiting even to pick up the bird I had shot. "What would have awaited me," he moaned in a most complaining tone, as if I had jumped into the river to bring woe on him, "if I had rowed you out and returned without you? The whole village," he sobbed, the tears actually appearing on his eyelids, "would not have been able to pay the blood-money for you, and I should never have been able to stay any longer there." Not a word escaped him as to my feelings on encountering a crocodile. He was evidently relieved of the heaviest

responsibility he had ever borne when he deposited me again on my own Rakit.

Some of the trees which were growing near the mouth of the side streams, could the forty or fifty feet of water in which they stood have been removed to show them from their roots upwards, must have been stupendous specimens of arboreal vegetation. I gathered a slender species of Pandan (*P. heliocopus*), standing above the water to a height of thirty to thirty-five feet, where the water measured between forty-five and fifty feet, giving seventy to eighty feet for its true height. Here I caught, in the act of swimming across the river, a lovely little Carnivore (*Linsang gracilis*), one of the most beautiful of its race, which, though I kept alive for a long time, never, to my regret, became very tame, and therefore did not gain in my affection the place that its beauty deserved, which was given to another member of my menagerie, the curious crepuscular honey-stealing Malay Bear.

My next halting place was the village of Pau, situated a little below the junction of the water of the Rawas region with the Musi which comes past Tebbing-tinggi, a celebrated prau building depôt doing a great trade with Palembang. These boats, from six to seven feet in breadth, are made from a single tree stem, out of which no one not acquainted with the manner of their construction, on seeing it newly felled, would believe that a boat of these dimensions could possibly be made. When the stem has been partially excavated, fires are kindled in the hollow, and bars of wood changed at intervals for longer ones, are forced in crosswise to separate the sides. The greatest possible care is necessary in this operation, as the heat often at the very last will start a knot, or crack the log, rendering all their work of months useless. A perfect *pantjalan*, therefore, costs a large sum.

Pleasant as "rakiting" was, it had its perils, for where the river widened out greatly and decreased in current, the wind blowing across the stream rendered navigation very dangerous. About 100 miles above Palembang (and 150 from the sea) we were caught in a heavy squall of wind and rain in the night time, which simply took the entire control of our rather unwieldy vessels. So intensely dark was the night that we had no idea, except when a momentary gleam of lightning lit up

the scene, in what direction we were being borne, and we spent several hours of great anxiety lest we should be driven on one of the many sunken tree stems with which the river was studded.

Four days sail below Pau and past the confluence of the Lamatang, with its complement of water and commerce from Lahat and Muara Enim, we found ourselves in the midst of growing signs of approach to a great centre of activity, making up for the monotony of the landscape through which we had for a day or two been travelling; for the low banks had shut out all view, and their distance on both sides, so broad was the river, had precluded me from identifying their vegetation. Large Palembang praus bright in scarlet or blue decorations, began to be met in little fleets, being laboriously poled up stream close under the banks out of the current; and every little while a gay skiff, propelled by two or three flashing oars, would enliven and glide athwart the picture, and disappearing again leave us to our plodding way. In the almost dead water we overtook and were overtaken in turn by numberless Rakits, single or in immense strings of from twenty to thirty made fast one behind the other, often nearly half a mile in length, and broad rafts hundreds of yards in length, mostly of laurel wood, for the cabinet makers for whom Palembang is famous.

At sundown on the 20th of December I moored, not far from the confluence of the Ogan, which brings to the capital the tribute of Muara-dua and Batu-radja, in sight of Palembang, amid a curious scene. Below my Rakit there stretched away to a great distance a broad unbroken plain of log rafts, on which a large population of men, women, and children was encamped; some were under the shelter of a few palm-leaf mats, others, detected by the light playing on their faces, crouched in small groups here and there round little fires, the whole, in the dying light of the still evening, forming a rather weird scene.

It was indeed with feelings of regret that I found I had arrived within sight of the end of a journey which will always remain in my memory as one of the deepest enjoyments of my life. Crowned by the last month of river-life, with its varying impressions and sensations, it had been full of the intensest gratification, and still is when I recall that long panorama-like picture.

To recall the magnificent flora of the upper reaches of the river almost makes me retract the statement that the tropics present few flowers; for so blossom-spangled a road it would be difficult to match anywhere;—it is only in the beginning of the wet season, however, and along the steep banks of some such river, wide enough to let in the sunlight and the free breath of heaven, that one must look for, or indeed expect to be able to see such a display. The singular trackless streets, roads, and paths of water by which I rambled among the forest avenues are never to be forgotten reminiscences; nor lower down the slow majesty of the widening river between its level banks fronted with tall reeds, dark-foliaged figs, and groves of Eriodendron trees, with their stiff trifid arms; and at last the broad expanse of its united affluents by whose sources I had for so many months encamped, drawing towards itself the atoms of produce of two degrees of latitude, and concentrating them into a hot nucleus of commercial life and activity. Intermingled with all these memories are a thousand indescribable vignettes; miniatures of quaint nooks and sandy bays, and embossed villages, of out-of-the-world ways and habits and customs, of the intermittent comers and goers; of the changing features of the river's face itself in wind and rain, in early morning or noonday sun, in evening shades, under the pale moon, and in the solemn silence of the darkness. Surveyed from my window in the intervals of occupation, or seated under the verandah in the cool evenings, this changing landscape of days and days (so placid and imperceptible was to me the motion of our gliding down, and so full of that exhilarating relief from labour and fatigue) seemed to move past my eyes of its own accord, and afforded me a continued and massive sensation of delight that nothing could disturb, and which can be but faintly conceived by those who have not experienced this uncommon mode of travel which is absolutely different from that by any other water-carriage.

My very last stage, however, was through, perhaps, as unwonted a scene as I may ever look on; it was an eight hours' sail through the city of Palembang itself, which is certainly one of the curiosities of the East. Throwing off from our anchorage about eight o'clock in the morning, we slid down between miles

and miles of log-rafts moored to the banks, packed close together forming an immense pavement, with an abundant population; then on each side Rakits large and small, in all positions—sideways, lengthwise, crossways, choke-a-block, as if the river had swept away a village or two and stranded them there anyhow—to which a continuous stream of little skiffs were constantly bringing the dealers in the different products, who might be seen in little knots on the steering stages discussing terms over siri and betel. Anxious to make advantageous terms, eager traders were shooting past on a several days' journey up stream to meet expected and valuably loaded Rakits, which, if large and freighted with dammar, gum elastic, gutta-percha, will cost as much as £500. As no bamboo grows near Palembang, and none of the larger sorts nearer than the sources of the river, the Rakit itself is an eager subject of barter, and always fetches a sum which largely remunerates the cost of its building and transport the whole length of the river. Seaward from this heterogeneous collection, which was not permitted to pass beyond the upper boundaries of the town to clog its avenues, I entered Palembang proper, a single row of cabins on each bank, with their faces to the river, built on immense log rafts which stretched out in front of them as a broad platform, forming their landing stage and approach—on one side the Malay portion of the town, on the other the Chinese shops and abodes—the whole rising and falling many feet with every tide. Everywhere innumerable little boats flashed about over the bright sunlit water, here with a woman in a blue tunic and a deep scarlet head-cloth calling out her store of fruits; there, propelled by urgent arms conveying the busy merchant; and from a hidden corner where it had been lying in wait, would dart out, like a spider from its lair, some other prau, and lassoing a slowly passing log would pull in again with an item of livelihood gleaned from the flotsam harvest which the river was continually bringing down.

At length a bend of the river brought me in sight of the European and official quarter of the city situated on the northern bank, opposite which lay at anchor, steamers and vessels of many rigs, all looking gigantic to my eyes, unaccustomed for so many months to such a sight. Slowly

floating down the river, I moored, with the Resident's* permission, opposite the Residency stairs. Instantly a curious crowd that never dispersed during the whole of my stay, lined the bank to see and discuss the unusual flotilla, which on my arrival presented a singularly picturesque appearance, as the entire exterior of my Rakit was one mass of blossoms from the orchids suspended round it, and its cargo of plants, skins, living birds, and Honey-bears, and the beautiful little Linsang formed an unwonted shipment.

Palembang, the capital of the Residency, contains a great population of from 50,000 to 60,000 souls, of Arab, Chinese, Javanese and Malays. They speak the Malay language intermixed with much Javanese, and write it either in Arabic or Javanese characters. It is the seat of a great export and import trade with Batavia, Singapore, Siam, and China, and is famed for its manufacture of furniture, especially of laquer work, made by Chinese brought for the purpose from their own country by rich Palembang-Chinese artificers, and for the weaving of rich sarongs of silk interwrought with gold into most elegant designs. Everywhere one perceived signs of business and activity, but I saw none so eager for employment as the ferry-boat men, who at the various landing-places screamed themselves hoarse at every approaching passenger, crying up the special qualities of their boats, and the generously low sum for which they would condescend to ferry one over, and then with sarcastic jokes and laughter falling to upbraid and praise the successful ferryman and his boat; they might have been Egyptian donkey drivers or English omnibus conductors, who had changed their skin and their occupation, rather than staid Malays.

The most important buildings are the combined palace and barracks of the Sultans built in 1780 by, as report goes, a European, a strong, massive edifice surrounded by a stone rampart in which now the garrison is quartered; the elegant house of the Resident, looking out on the river from a little distance back; the Chinese Joss-house, and the Mosque floored with marble, and having a minaret 100 feet high. It is nearly 150 years of age; but it certainly looks better at a little distance

* At that time, the distinguished and urbane officer, Mr. Laging Tobias, afterwards Governor of Acheen.

off than at close quarters. Besides these, a little way from the town, are the tombs of the Sultans, where many of the devout go to pray; but perhaps the most interesting and curious to the Western visitor—a spot held in the utmost veneration by the Palembangers—is the grave of *Sekandar Alam*, or Alexander the Great, whom the Sultans and most of the chiefs of Palembang claim as their illustrious fore-father.

In the neighbourhood of the Government offices stands the market, which—as are many of the houses, especially those of the Chinese shop-keepers—is substantially built of stone, a material which along with iron-wood, was during the reign of the Sultans forbidden to all save members of the Royal house as a building material.

On Sunday, the 25th December, twelve months from my starting from the mouth of the Semangka River, I sailed for Batavia, and the last pictures of Sumatra that I recall are the heaving and surging in the troubled water of our screw of the floating dwellings on both banks as far as the eye could reach to what seemed their imminent destruction, attended by the overthrow from the gaping and closing of the log platforms of the children at their play (some of them actually into the river), their ineffectual scrambling to regain their footing, and the attempts of their more unconcerned elders to retain theirs on the unstable foundations of their home—in some aspects a very ludicrous scene; and the interminable stretch of nipa-palms that cover, in a low dense forest, the watery uninhabitable mud-flats that extend for fifty miles from the city to the sea.

After making a short call at Muntok in Banka, between which and Sumatra a plateau covered by only three fathoms of water exists, I was landed on the 27th of the month in Batavia, where I at once set about my preparations for an extended journey to the less civilised islands in the Far East of the Archipelago.

APPENDIX TO PART III.

I.—ON THE OSTEOLOGICAL CHARACTERS OF THE KUBUS OF SUMATRA.

By J. G. Garson, M.D., F.Z.S., Memb. Anthrop. Inst.; Royal Col. Surg. Eng.; Lecturer on Comparative Anatomy, Charing Cross Hospital.

The osteological remains of the Kubus of Sumatra, placed in my hands for examination by Mr. H. O. Forbes, consisted of the skeleton of a female and a single skull, also that of a female, which are now in the possession of the British Museum. Both specimens were those of adults of middle age.

The height of seven males (measured by Mr. Forbes) averaged 1569 mm., or almost exactly the same as that of adult Englishwomen (1592 mm.), while the average height of the five females was 1493 mm.; the difference between the stature of the male and female Kubus is therefore 103 mm. The height of the skeleton placed in my hands, estimated from the length of the femur, is 1450 mm., which, allowing for the soft parts existing in the living body, would indicate the stature of this individual to be about the average of the females measured by Mr. Forbes.

Characters of the Skull.

Cranium.—The appearance presented by the drawings taken from life by Mr. Forbes shows that the skull is of moderate length, somewhat narrow transversely in the region of the forehead, and flat in the glabella and superciliary regions: the malars are prominent, the nose becomes gradually elevated towards the tip, its contour following a wide arc: the chin is narrow but not pointed; the lips are thick and prominent, and the hair is straight with a tendency to curl.

Turning to the skulls we are at once struck by the strong resemblance they bear to one another in general appearance, the only difference observable being that that belonging to the skeleton is somewhat larger generally than the other. This resemblance between the two skulls is confirmed by an examination of the principal measurements, which are given in the annexed table. The maximum length of the one is 174 mm., and of the other 173 mm., while their maximum breadth is 135 mm. and 136 mm. respectively. These measurements give a cephalic index to the one of 77·6, and to the other of 78·6, which places them in the mesatecephalic group of Flower, and of the Frankfürter Verstendiüng.

The altitudinal index (the ratio of the basio-bregmatic height to the maximum length) differs somewhat in the the two skulls, that belonging to the skeleton being considerably higher than the other; but in neither instance does the height exceed the breadth.

The general form of the cranium, as seen in the *norma verticalis*, is

narrow in front, the sides straight and gradually diverging to the parietal eminences, which are situated near the posterior border of the parietal bones. The differences in the broadening out of the cranium from the anterior frontal to the parietal regions in the two skulls is well seen by comparing the relation of the minimum and maximum frontal breadths of each with their respective maximum breadth, this latter being taken as 100. In the skull belonging to the skeleton, which we will designate as No. 1, the indices are 67·4, 79·2, and 100; in the other skull, which we will call No. 2, they are 64, 77·2, and 100. The glabellar region is flat and smooth, corresponding to outline No. 0 of Broca in skull No. 1, and to No. 1. in skull No. 2; superciliary ridges are entirely absent. The forehead rises somewhat vertically to the level of the frontal eminences (which are not prominent), and then slopes backwards and upwards till it attains its maximum, which is situated in the parietal region. Viewed from the *norma frontalis*, the arch of the top of the cranium is markedly flat, giving the stephanic region a somewhat angular appearance. In the parieto-occipital region the contour of the cranium falls with a moderate curve towards the foramen magnum. The general surface of the cranium is smooth, and the muscular ridges are little pronounced. The mastoid processes are feebly developed.

The sutures are very simple in No. 2, but somewhat more complicated in No. 1, though still simple; those in the former being represented by Broca's outlines of complication of sutures No. 2 for the fronto-parietal, and No. 3 for the parieto-occipital suture, the latter by No. 2—3 for the fronto-parietal, and No. 4 for the parieto-occipital. Wormian bones are not present in either skull. In No. 2 the sutures are more open than in No. 1,* in which the coronal and sagittal sutures are approaching obliteration.

With regard to the projection of the zygomatic arches, in relation to the contour of the bi-stephanic region, No. 2 is slightly phænozygous, but in No. 1 the arches are not visible, bi-zygo-stephanic index being 87·7 in No. 1, and 91·3 in No. 2. In my paper on the Cranial Characters of the Natives of Timor-laut,† I showed that skulls in which this index is 90 and upwards are phænozygous; these Kubu skulls are therefore on the border-line between the two conditions. The inion is fully developed in both skulls, being represented by Broca's outline No. 1.

The average horizontal circumference of the two skulls is 490 mm., 10 mm. less than the average circumference of the heads of the five living females measured by Mr. Forbes.

Facial portion.—The nasal bones have a very characteristic shape; they are not moderately prominent in respect to the plane of the face, and form a gentle curve from above downwards, being intermediate in curve between Broca's outlines Nos. 1 and 2. The nasal aperture differs in the two skulls: in No. 1 it is longer and slightly narrower than in No. 2, the index of the former being 50, while that of the latter is 56·8, which places No. 1. in the middle of the mesorhine group (48—53), and No. 2 well within the platyrhine (above 53). The inferior border is nearly straight transversly, and is fairly well defined. The nasal spine of No. 1 is represented by Broca's outline No. 2, and in skull No. 2 by the outline of No. 1.

The orbits are somewhat more rounded in No. 1 than in No. 2, the orbital index of the former being 89·2 and of the latter 80·1. The margins of the orbits are thin and sharply defined.

* Report of the Anthrop. Committee of the Brit. Assoc. (Rep. Brit. Assoc. p. 260, 1883).

† Journ. Anthrop. Inst. vol. xiii. p. 391 (1884).

The malar bones are narrow vertically, flattened anteriorly, and curve abruptly backwards, which gives that marked prominence at the malar point so well seen in the drawings by Mr. Forbes. The nasi-malar angle of No. 1 skull is 143°, and of the other 140°.

The alveolar index of the two skulls is very similar, being 96·9 in No. 1, and 98·8 in No. 2. They are therefore on the border-land, figuratively speaking, between orthognathous and mesognathous.

The palato-maxillary index of No. 1 is 126, and of No. 2, 120·4, measuring the length and breadth of this region according to Professor Flower's plan. The palate is comparatively flat. The teeth are in good condition, small in size, and little worn. In No. 1 the two upper incisors have been lost during life.

The relation of the breadth of the middle portion of the face, from the alveolar point to the nasion, to the bi-zygomatic breadth (the latter being taken as 100), is as 52·5 and 53·9 to 100 in the two skulls respectively. This is the mid-facial index of Kolmann, and shows a very close similarity in the two skulls.

The different measurements of the mandible show great similarity. The chief point to be noted in this bone is the obtuseness of the symphesial angle, which is 84° in the one, and 88° in the other skull, indicating a much more vertical chin than obtains generally in Europeans.

The pelvis not being articulated, I was unable to ascertain all the measurements which should be taken, but I measured the transverse and antero-posterior diameter of the brim, which are undoubtedly the most important dimensions. The transverse diameter of the brim measured 177 mm., and the antero-posterior diameter 122, which gives a pelvic index (taking the transverse diameter as 100) of 104·3. The index of forty-nine European female pelves, measured by Verneau and myself, was 79·0; while that of thirteen Andamanese, measured by myself, was 96·2. The antero-posterior length in comparison to the transverse breadth of the brim in this Kubu woman's pelvis is extreme; indeed I have never seen or measured a pelvis of so exaggerated a type, approaching in form nearly to that of the anthropomorphous apes. The great antero-posterior length of this specimen is due chiefly to the straightness of the sacrum. It is extremely desirable that additional specimens should be procured, so as to ascertain whether such a form of pelvis is normal in this race.

The scapular index, or the ratio of the breadth of the scapula to the length, the latter being taken as 100, is 72·95 in the Kubu, in the Europeans (Flower and myself) 65·2, in Negroes (Broca) 68·16, and in Andamanese (Flower) 69·8.

The limb bones are slender; the index obtained by comparison of the upper and lower limbs with each other—the inter-membral index, or the length of the humerus and radius added together—compared with that of the femur and tibia (the latter being taken as 100), is 70. This index in Europeans measured by Professors Broca and Flower was found to be 69·2 and 69·73 respectively; in Negroes Broca ascertained it to be 68·27; and in nineteen Andamanese Flower found it to be 68·3.

This high index shows an approximation in the proportions of the limbs of the Kubus to those of the anthropoid apes, and indicates that the length of the upper limb is considerably greater in proportion than that of the lower as compared to what obtains in Europeans. In the Negro and the Andamanese, on the other hand, the upper limb is proportionately shorter than the lower.

The femoro-humeral index, or the ratio of the humerus to the femur, the latter being taken as 100, is 75·2. In twenty Europeans measured

by Broca and Flower it is 72·45, in sixteen Negroes (Broca) 69·79, and in nineteen Andamanese (Flower) 69·8. In this index also the variation in the Kubus from the Europeans is in an opposite direction to that of the Negroes and the Andamanese.

The femoro-tibial index, or the ratio of the tibia to the femur, the latter being taken as 100, is 80·7 in the Kubu, 82·1 in the European (Flower), 84·7 in the Negro (Humphrey), and 84·5 in the Andamanese (Flower).

The humero-radial index, or the length of the radius compared to the humerus, the latter being taken as 100, is 74·1, in Europeans (Broca and Flower) 73·9, in Negroes (Broca) 79·4, and in Andamanese (Flower) 81·0.

Relations of the Kubus to other Races.

I have already said that on comparing the two skulls side by side, one is struck with the close resemblance they bear to one another. There is quite as close a resemblance between these two skulls as exists between Andamanese skulls. Such a condition occurring in a sufficiently large series would indicate purity of race, or at least isolation for a long period of years. Unfortunately the number of Kubu skulls before us is not sufficiently large to justify very definite statements regarding them, though I think sufficient to answer one question which presents itself to us for solution: namely, as to what race the Kubus are allied—whether they possess Negrito or Malayan affinities. The character of the hair, the form of the nose, the various characters of the skull, and the proportion of the limb bones show that they cannot have any near affinity to the Negrito race found in various parts of the Indo-Malayan Archipelago, but that they are decidedly Malays, and therefore Mongoloid. The high nasi-malar angle, the high and broad face, the flat forehead owing to absence of all glabellar and superciliary ridges, the slight subglabellar nasal depressions, and the nomadic life they lead, are all highly characteristic of the Mongolian race.

The frizzle in the hair seen in the drawings by Mr. Forbes is probably to be accounted for by their having at some remote period intermingled slightly with the Negrito people, possibly during their migration southward. There is, however, evidence that they have for a long period been isolated from the other surrounding inhabitants of the island, and that by absence of infusion of fresh blood they have come to resemble one another so closely that they now possess certain definite characteristics of a more or less stable nature. It is, however, very desirable that these observations should be extended by a study of a larger quantity of material from which to gather information than has been at my disposal. In the meantime we have to thank Mr. Forbes for the trouble he has been at to secure what must be considered a very valuable addition to our specimens illustrating the osteology of the Indo-Malayan Archipelago.

[From the Journal of the Anthropological Institute for November, 1884.]

CRANIAL MEASUREMENTS

Race, Kubu. Age.	Sex.	1. Capacity.	2. Length, maximum.	3. Breadth, maximum.	4. Minimum frontal breadth.	5. Maximum frontal breadth.	6. Height.	Longitudinal arcs.				11. Auriculo-bregmatic arc.	12. Total transverse circumference.	13. Total horizontal circumference	14. Pre-auricular arc.	15. Length of foramen magnum.	16. Basio-nasial length.	17. Total medium circumference, 11 + 15 + 16.
								7. Frontal.	8. Parietal.	9. Occipital.	10. Fronto-occipital.							
No. 1, Adult	♂	...	174	135	91	107	132	128	107	124	359	285	415	495	227	33	98	480
No. 2, „	♀	...	173	136	87	105	125	115	105	128	348	275	398	485	209	35	91	474

	FACIAL MEASUREMENTS.													MANDIBLE.						
No.	Basi-alveolar length.	Alveolo-nasial length.	Nasal aperture.		Inter-orbital width.	Orbit.		Malar height.	Bi-jugal breadth.	Bi-zygomatic breadth.	Palato-maxillary.		Nasi-malar angle.	Bi-gonial breadth.	Condylo-gonial length.	Gonio-symphesial length.	Symphesial height.	Molar height.	Antero-posterior breadth of ramus.	Symphesial angle.
			Length.	Breadth.		Breadth.	Height.				Length.	Breadth.								
No. 1	35	64	48	24	19	37	33	20	107	122	50	63	143°	91	54	81	32	26	34	84°
„ 2	30	61	44	25	21	37	30	20	105	115	49	59	140°	91	51	78	79	25	34	88°

	Indices.							Broca's descriptive Nos. indicating size of					Appendicular skeleton.							
													Brim of pelvis.				Scapula.			
	Length-breadth.	Length-height.	Alveolar.	Mid-facial.	Nasal.	Orbital.	Palato-Maxillary.	Glabella.	Nasal bones.	Nasal spine.	Inion.	Wear of teeth.	Antero-posterior diameter.	Transverse diameter.	Femur.	Tibia.	Length.	Breadth.	Humerus.	Radius.
No. 1	77·6	75·9	96·9	52·5	50·0	89·2	126·0	0	2–3	2	1	0	122	117	399	322	122	88	290	215
„ 2	78·6	72·2	98·8	53·9	56·8	80·1	120·4	1	3	1	1	0	—	—	—	—	—	—	—	—

MEASUREMENTS OF LIVING KUBUS BY THE AUTHOR.

Sex.	Height in metres.	Circumference of head.	Arm, from shoulder to elbow.	Arm, from shoulder to tip of middle finger.	Circumference of chest at rest.	Circumference of chest during inspiration across mammæ.	Stretch of arm from tip to tip of fingers.
♂							
I	1 5825	0·530	0·350	0·780	0·7800	0·8100	—
II	1·5825	0·525	0·325	0·750	0·7600	0·8000	1·5900
III	1 6000	0·537	0·325	0·745	0·7925	0·8025	1·5950
IV	1·6300	0·522	0·345	0 755	0·7650	0·7700	1·6500
V	1·5800	0·530	0·330	0·765	0·7400	0·7600	1·6100
VI	1·5775	0·530	0·315	0·750	—	0·7725	1·6050
VII	1·6200	0·520	0·355	0·785	0·7725	0·8025	1·6400
Average ..	1 596	0·526	0·335	0·7614	0·7684	0·7883	1·6150
♀							
I	1·460	0·510	0·300	0·670	0·76*	—	1·485
II	1·480	0·520	0·270	0·630	0·75	0·7800	1·455
III	1·495	0·510	0·315	0·700	0·81	0·8175	1·535
IV	1·535 had 3 children	0·500	0·315	0·725	0·73	0·7550	1·560
V	1·495 had 5 children	0·502	0·330	0·725	0·68	0·7100	1·520
Average ..	1·493	0·508	0·306	0·690	0·746	0·7157	1·511

* Round breasts.

II.—LIST OF THE BIRDS OF SUMATRA.

"The first systematic account of the avi-fauna of Sumatra" (I quote from the late Lord Tweeddale's valuable paper, On a collection of birds made in the Lampongs in 1876 by Mr. E. C. Buxton, in the *Ibis* for 1877, page 283) "was written by Sir Stamford Raffles at Fort Marlborough, near Bencoolen. . . Most of the birds enumerated were obtained in the vicinity of Bencoolen itself, or during short trips into the interior of the district of that name, during the years 1819 and 1820, partly by Sir Stamford, assisted by Dr. Joseph Arnold, and partly by Messrs. Diard and Duvaucel. These two gentlemen were French naturalists, whose services Sir Stamford had secured while on a visit to Bengal. An unfortunate misunderstanding that soon after their arrival in Sumatra occurred between the Lieutenant-Governor and these two Frenchmen, led, in about twelve months, to a cessation of their labours, and to their departure from Bencoolen; and Sir Stamford was obliged to undertake the description of the materials collected himself, or to allow the results to be published in France. Hence his papers in the 'Linnean Transactions.' The number of species therein catalogued, and more or less described, is about 168. But some birds obtained in the Prince-of-Wales Island and Singapore are included, and a few species appear to have been introduced into the list through oversight, and on the strength of caged birds.

"In 1830, Lady Raffles published a memoir of her late husband, to which was appended a catalogue, by Vigors, of the zoological specimens collected in Sumatra. . . . About 194 species are enumerated.

"Since 1830, no attempt at a complete account of the birds of Sumatra has been published; but a good many species not contained in Vigors' list have been discovered and described, principally by the Dutch zoologists, more particularly by Temminck and by Solomon Müller. Mr. A. R. Wallace, during a stay of about three months in the year 1861, collected some birds in the district of Palembang, penetrating a hundred and twenty miles inland; but no separate account of his collection has appeared.

"During a period of about five months, commencing the 30th of May 1876, Mr. Edmond C. Buxton travelled in the Lampong district . . . He started from Telok Betong, and went inland to Sukadana, a distance of about eighty miles, and obtained in all 152 species, of which two were undescribed."

"From 1877–1879, the Dutch mid-Sumatra expedition, through the Padang Highlands and along the Batang Hari river, added much to our knowledge of the natural history of that region.

From June to September, 1878, Dr. Beccari, the well-known Italian naturalist, visited and collected on the mountains of Padang, chiefly on Mount Singalan (8900 feet). It contained representatives of many Indo-Chinese genera which have not been found in the Lampongs, some of which were, however, collected by the Author in the more Southern residency of Palembang.

In August of the same year, Mr. Carl Bock, a Swedish naturalist, collected over the same region on behalf of the late Lord Tweeddale, obtaining 166 species. An account of this collection by Captain Wardlaw Ramsay will be found in the Proceedings of the Zoological Society of London, 1880, p. 13.

During 1880–1881, the Author made extensive collections in the Lampong and Palembang Residencies, which have been carefully worked out by Mr. F. Nicholson, and a list given in the *Ibis* for 1879, pp. 51 and 235.

Astur trivirgatus, *Temm.* Lampongs.
soloensis. *Lath.*
Accipiter virgatus, *Temm.* Padang.
Neopus malayensis, *Temm.*
Spizaetus lanmaetus, *Horsf.*
Spilornis pallidus, *Wald.* Lampongs.
bacha, *Daud.* Palembang. Lampongs.
Haliastur intermedius, *Garn.*
Milvus govinda, *Sykes.*
Pernis ptilonorhynchus, *Temm.*
Baza sumatrensis, *Lafr.* Palembang.
Microhierax fringillarius, *Drap.* Lampongs. Palembang.
Falco peregrinus, *Gm.*
melanogenys, *Gould.*
Polioætus humilis, *Mül. and Schl.* Palembang.
ichthyaetus, *Horsf.*
Ketupa javanensis, *Less.* Lampongs.
Bubo orientalis, *Horsf.*
Scops lempiji, *Horsf.* Lampongs.
rufescens, *Horsf.*
Glaucidium sylvaticum, *Bp.*
Ninox scutulata, *Raffl.* Lampongs.
Syrnium myrtha, *Bp.* Palembang.
Rhopodytes erythrognathus, *Hartl.* Lampongs.
diardi, *Less.* Lampongs.
Centrococcyx eurycercus, *Hay.* Lampongs. Palembang.
javanensis, *Dum.* Palembang.
Zanclostomus javanicus, *Horsf.* Lampongs. Palembang.
Surniculus lugubris, *L.* Lampongs.
Chrysococcyx xanthorhynchus, *Horsf.*
Hierococcyx fugax, *Horsf.* Lampongs.
Penthoceryx pravatus, *Horsf.* Lampongs.
Rhinortha chlorphœa, *Raffl.*
Chrysophlegma mystacalis, *Salv.* Padang. Palembang.
Xylolepus validus, *Raffl.* Lampongs. Palembang.
Thriponax javensis, *Horsf.* Lampongs.
Tiga rafflesi, *Vigors.* Lampongs.
javanensis, *Ljung.*
Iyngipicus auritus, *Eyt.* Lampongs.
Callolophus mentalis, *Temm.* Lampongs.
puniceus, *Horsf.* Lampongs.
malaccensis, *Lath.*
Micropternus badius, *Raffl.*
Meiglyptes tristis, *Horsf.* Lampongs.
tukki, *Horsf.* Lampongs.
Dendrotypes analis, *Horsf.* Lampongs.
Henicurus sordidus, *Eyt.* Lampongs.
Loriculus galgulus, *L.* Palembang.
Palæornis longicauda, *Bodd.* Palembang.
Psittinus incertus, *Shaw.* Lampongs.
Orescius gouldi, *Bp.* Palembang.
Harpactes duvaucelii, *Temm.* Lampongs.
kasumba, *Raffles.* Lampongs.
erythrocephalus, *Gould.*
Batrachostomus cornutus, *Temm.* Lampongs.
Caprimulgus pulchellus, *Salv.* Padang.
Lyncornis temminckii, *Gould.* Lampongs.
Merops sumatrana, *Raffles.* Lampongs. Palembang.
philippinus, *L.* Padang.
Nyctiornis amicta, *Temm.* Lampongs. Palembang.
Megalæma mystacophanos, *Temm.* Lampongs.
chrysopogon, *Temm.* Lampongs.

Sasia abnormis, *Temm.* Lampongs.
Cypselus subfurcatus, *Blyth.* Padang.
Collocalia francica, *Gm.* Padang.
Macropteryx comatus, *Temm.* Lampongs.
longipennis, *Raffl.* Lampongs.
Carcineu'es pulchellus, *Horsf.* Lampongs. Palembang.
Halcyon pileata, *Bodd.* Lampongs. Palembang.
Sauropatis chloris, *Bodd.* Lampongs.
Pelargopsis fraseri, *Sharpe.* Lampongs. Palembang.
Alcedo euryzona, *Shaw.* Lampongs.
meninting, *Horsf.* Lampongs.
bengalensis, *Gm.* Lampongs.
Ceyx rufidorsa, *Less.* Lampongs. Palembang.
Megalæma versicolor, *Raffles.* Lampongs.
Xantholæma rosea, *Dumont.* Lampongs.
hæmacephala, *Müll.* Lampongs.
duvaucelli, *Less.* Lampongs.
Caloramphus hayi, *Gray.* Padang.
Psilopogon pyrolophus, *Mall.* Palembang.
Hydrocissa albirostris, *Shaw.* Lampongs.
Anthracoceros malayanus, *Raffles.* Lampongs.
convexus, *Temm.* Lampongs.
Anorhinus galeritus, *Temm.* Lampongs.
Rhytidoceros undulatus, *Shaw.* Lampongs.
subruficollis, *Blyth.* Palembang.
Buceros rhinoceros, *L.* Palembang. Lampongs
Corone macrorhyncha, *Wagl.*
enca, *Horsf.*
Dendrocitta occipitalis, *Müll.*
Crypsirhina varians, *Lath.*
Cissa chinensis, *Bodd*, var. minor, *Cab.*
Platysmurus leucopterus, *Temm.*
Oriolus maculatus, *Vieill.* Palembang.
xanthonotus, *Horsf.* Palembang
cruentus, *Wagl.*
Dicrurus annectens, *Hodgs.* Palembang.
sumatranus, *W. Rams.*
Chaptia malayensis, *Blyth.*
Buchanga cineracea, *Horsf.*
Bhringa resmifer, *Temm.*
Dissemurus paradiseus, *L.*
Irena criniger, *Sharpe.* Palembang.
Tephrodornis gularis, *Raffl.*
Hemipus intermedius, *Salv.* Padang.
obscurus, *Horsf.*
Platylophus coronatus, *Raffl.* Lampongs.
Coelioa beccarii, *Salvad.*
Artamides sumatrensis, *Mall.*
Graucalus melanocephalus, *Salvad.* Padang.
Pericrocotus xanthogaster, *Raffl.* Palembang.
montanus, *Salvad.*
cinereus, *Lafr.*
peregrinus, *L.*
Lalage terat, *Bodd.*
fimbriata, *Temm.*, var. culminata, *Hay.*
Alseonax laticostris, *Raffl.*
Poliomyias luteola, *Pall.* Palembang.
Muscicapula hyperythra, *Blyth.*
maculata.
Xanthopygia cyanomelæna, *Temm*
Hypothymis azurea, *Bodd.*
occipitalis, *Vig.*

Rhipidura javanica, *Sparrm.*
perlata, *Müll.*
albicollis, *Vieill.*
salvadorii, *Sharpe.*
Terpsiphone affinis, *Blyth.*
incii, *Gould.*
Philentoma pyrrhopterum, *Temm.*
velatum, *Temm.*
Rhinomyias pectoralis, *Salvad.*
Culicicapa ceylonensis, *Swains.* Palembang.
Stoparola ruficrissa, *Salvad.* Padang.
concreta, *Müll.*
thalassinoides, *Salvad.*
Siphia elegans, *Temm.* Lampongs. Palembang.
sumatrensis, *Sharpe.*
Digenea solitaria, *Müll.* Padang.
Niltava grandis, *Blyth.* Padang.
Phylloscopus borealis, *Blas.*
viridipennis, *Blyth.*
Luscinia fuliginiventris, *Hodgs.*
Geocichla sibirica, *Pall.*
Turdus cabanisi, *Bp.*
Ægithina viridissima, *Bp.*
tiphia, *L.* var. viridis, *Bp.*
var. scapularis, *Horsf.*
Chloropsis viridis, *Horsf.*
zosterops, *Vigors.*
media, *Bp.*
icterocephala, *Less.*
cyanopogon, *Temm.*
venusta, *Bp.*
Hemixus cinereus, *Blyth.*
malaccensis, *Blyth.*
sumatranus, *Wardl. Rams.*
Iole olivacea, *Blyth.*
Pinarocichla cuptilosa, *Jard. & Selb.*
Micropus melanocephalus, *Gm.*
Criniger phæocephalus, *Hartl.*
gutturalis, *Bp.*
Tricholestes criniger, *Blyth.*
Trachycomus ochrocephalus, *Gm.*
Pycnonotus bimaculatus, *Horsf.*
analis, *Horsf.*
plumosus, *Blyth.*
simplex, *Less.*
salvadorii, *Sharpe.*
leucogrammicus, *Müll.*
tygus, *Bp.*
Rubigula dispar, *Horsf.*
cyaniventris, *Blyth.*
squamata, *Temm.*
webberi, *Hume.*
Irena crinigera, *Sharpe.*
Pnoepyga pusilla, *Hodgs.*
Orthotomus atrigularis, *Temm.* Lampongs.
cineraceous, *Blyth.* Lampongs. Palembang
ruficeps, *Less.* Lampongs.
sepium, *Horsf.*
Phyllergates cucullatus, *Temm.* Palembang.
Hydrocichla ruficapilla, *Temm.* Lampongs.
frontalis, *Blyth.* Lampongs.
velatus *Temm.* Palembang.

Eupetes macrocercus, *Temm.*
Sibia simillima, *Salvad.* Palembang.
Garrulax bicolor, *Hartl.* Palembang.
palliatus, *Temm.* Palembang. Padang.
Melanocichla lugubris, *Müll.* Padang.
Rhinocichla mitrata, *S. Müll.* Lampongs. Palembang.
Stachyris larvata, *Bp.* Palembang.
poliocephala, *Temm.* Palembang.
nigricollis, *Temm.*
thoracica, *Temm.*
maculata, *Temm.*
Turdinus magnirostris, *Moore.*
loricatus, *Müll.* Padang.
rufipectus, *Salv.* Padang.
Erythrocichla bicolor, *Less.* Palembang.
Drymocataphus nigricapitatus, *Eyton.* Lampongs.
Trichostoma rostratum, *Blyth.*
Myiophoneus dicrorhynchus, *Salvad.* Palembang. Padang.
melanurus, *Salvad.* Lampongs. Palembang. Padang.
castaneus, *Wardl. Rams.* Padang.
Brachypteryx buxtoni, *Tweed.* Lampongs.
flaviventris, *Salvad.* Padang.
umbratilis, *Strickl.* Palembang.
saturatus, *Salvad.* Palembang.
Copsychus musicus, *Raffl.* Lampongs.
Cittocincla tricolor, *Vieill*, var. suavis *Sel.* Lampongs.
Suya albigularis, *Hume.* Palembang.
Prinia familiaris, *Horsf.* Lampongs.
Burnesia flaviventris, *Deless.* Lampongs. Padang.
Malacopterum magnum, *Eyt.* Palembang. Lampongs.
cinereum, *Eyt.* Palembang.
lepidocephalum, *Gr.*
affine, *Blyth.* Palembang.
Mixornis gularis, *Raffl.* Palembang.
erythroptera, *Blyth.* Lampongs. Palembang.
Macronus ptilosus, *Jard. & Selb.* Lampongs. Palembang.
Anuropsis malaccensis, *Hartl.* Palembang.
Turdinulus murinus, *Blyth.*
Rimator albostriatus, *Salvad.*
Stachyridopsis assimilis, *Wald.* Palembang.
Mesia laurinæ, *Salvad.* Padang.
Parus sultaneus, *Hodgs.*
cinereus, *Bonn. & Vieill.*
Pterorythrius æralatus, *Tickell*, var. cameranoi, *Salvad.* Padang.
Pachycephala grisola, *Blyth.*
brunneicauda, *Salvad.*
Lanius tigrinus, *Drapiez.* Palembang.
bentet, *Horsf.* Padang.
Sitta frontalis, *Horsf.*
Chalcostetha insignis. *Temm.*
Æthopyga temminckii, *Müll.*
siparaja, *Raffl.*
Cinnyris hasselti, *Temm.* Bencoolen. Palembang.
pectoralis, *Horsf.* Palembang.
Arachnothera crassirostris, *Reich.*
longirostris, *Lath.* Palembang.
affinis, *Horsf.* Palembang.
chrysogenys, *Temm.* Bencoolen.
flaviventris, *Gadow.*
Anthothreptes hypogrammica, *Müll.*
simplex, *Müll.*
phœnicotis, *Temm.* Palembang.

Anthothreptes malaccensis, *Scop.* Palembang. Bencoolen.
Zosterops aureiventer, *Hume.* Lampongs.
chlorates, *Hartl.* Palembang.
atricapilla, *Salvad.* Padang.
flava, *Horsf.*
fallax, *Sharpe.*
frigida, *Müll.*
Dicæum flammeum, *Sparm.* Lampongs.
olivaceum, *Wald.* Lampongs
trigonostigma, *Scop.* Lampongs.
Pitta boschii, *Müll. & Schl.* Lampongs.
muelleri, *Horsf.* Lampongs.
venusta, *Müll.* Palembang.
Calobates melanope, *Pallas.* Lampongs.
Budytes viridis, *Gm.* Lampongs.
Anthus rufulus, *V.*
Hirundo javanica, *Sparm.*
Cymborhynchus macrorhynchus, *Gm.* Lampongs.
Calyptomena viridis, *Raffles.* Lampongs.
Eurlyæmus ochromelas, *Raffl.*
javanicus, *Horsf.*
Corydon sumatranus, *Raffles.* Lampongs.
Calornis chalybea, *Horsf.* Lampongs.
Sturnopaster contra, *L.* Lampongs.
Gracula javanensis, *Osb.* Lampongs.
Artamus leucogaster, *Val.* Lampongs.
Analcipus cruentus, *Vogl.* Padang.
Padda orizivora, *L.* Lampongs.
Munia maja, *L.* Lampongs.
punctularia, *L.* Palembang.
leucogastroides, *Moore.* Lampongs.
atricapilla, *V.* Palembang.
Ploceus maculatus, *Mall.* Lampongs.
Erythrura prasina, *Sparm.* Lampongs.
Treron nipalensis, *Hodgs.* Lampongs.
Butreron capellei, *Temm.* Lampongs.
Sphenocercus oxyurus, *Reinw.*
Osmotreron vernans, *L.* Lampongs. Padang.
olax, *Temm.* Lampongs.
Spilopelia tigrina, *Temm.* Lampongs.
Geopelia striata, *L.* Lampongs.
Chalcophaps indica, *L.* Lampongs.
Carpophaga badia, *Raffl.* Lampongs.
ænea, *L.* Lampongs. Palembang. Padang.
Macropygia leptogrammica, *Temm.*
Argusianus argus, *L.* Lampongs. Palembang.
Polyplectron chalcurum, *T.* Palembang.
Euplocomus vieilloti, *Gray.* Padang.
Acomus inornatus, *Salvad.* Padang.
Gallus ferrugineus, *Gm.* Palembang.
Rhizothera longirostris, *Temm.*
Arborophila personata, *Horsf.* Palembang.
Peloperdix rubrirostris, *Salvad.* Padang.
Excalfactoria chinensis, *L.* Palembang.
Rollulus rouloul, *Scop.* Lampongs. Palembang.
Caloperdix oculea, *Temm.* Palembang.
Turnix pugnax, *Temm.* Padang.
Charadrius fulvus, *Gm.* Lampongs.
Ægialitis geoffroyi, *Wagl.* Lampongs.
Glareola orientalis *Leach.* Lampongs.
Ardea purpurea, *L.*
Herodias intermedia, *Hasselt.* Palembang

Demigretta sacra, *Gm.* Lampongs.
Bubulcus coromandus, *Bodd.* Palembang. Padang.
Ardetta cinnamomea, *Gm.* Padang.
Butorides javanica, *Horsf.* Palembang.
Leptoptilus javanicus, *Horsf.* Palembang.
Tantalus lacteus, *Temm.* Palembang.
Totanus glareola, *L.* Lampongs.
Tringoides hypoleucus, *L.* Lampongs.
Scolopax rusticola, *L.*
Rhynchæa capensis, *L.* Padang. Palembang.
Hypotænidia striata, *L.* Palembang. Padang.
Erythra phœnicura, *Forst.* Lampongs.
Dendrocygna arcuata, *Horsf.*
Sterna media, *Horsf.*
bergii, *Licht.*

III.—ADDITIONS TO THE INSECT FAUNA OF SUMATRA.

Descriptions of LEPIDOTERA *discovered by the Author in Sumatra.*

The descriptions of species under Mr. Smith's or Mr. Butler's name, have been kindly prepared by them for me.

NYMPHALIDÆ.

Trepsichrois van-deventeri, mihi, sp. nov.—Intermediate between *T. mulciber* of Borneo and *T. linnei*; differs from the former in the slightly larger spots on fore-wings of male, and in the well-defined whiter markings in the female—in *T. mulciber* they are brownish; from *T. linnei* it differs in its smaller size, less angulated fore-wings, smaller spots on these wings in both sexes and much narrower streaks on hind-wings of female; it occurs in Sumatra, Malacca, and Cachar (Assam). Lampongs, No. 99. This species is named in honour of Mr. Justice Van Deventer. of the Dutch-Indian Bench.

Kallima spiridiva, Smith, sp. nov.—Upper side: anterior wing, uniform dark brown, almost black, crossed from the centre of the costa to the inner angle by a broad band of pale blue, in which between the first and second median nervures is a small vitreous spot; a small white spot near the apex, which is not falcate, as in *paralecta* and other species of this genus. Posterior wings with an irregular, almost obsolete, sub-marginal black line. Both wings with a slight purple gloss. Under side: with markings and spots resembling *paralecta*, but the colouring is subject to variation, as of the two examples I have, one is rich brown, and the other olive-green. Expansion, $3\frac{1}{8}$ inches. This species is about the same size as *K. albofasciata*, but is distinct from it as well as from *paralecta*. Sumatra. Type in Mus. H. G. Smith, Esq.

Cethosia carolinæ, mihi, sp. nov.—Differs from the *C. menalis* in having the transverse black lines more uniform in width, and the white patch at centre of external area of fore-wings of little more than half the width; the sub-apical white spots are also smaller, and the orange patch at anal angle of hind-wings is considerably larger. Sumatra. Hoodjoong, Palembang Residency. No. 215. I have named this species in recognition of the kindness of my sister-in-law, Miss C. Keith, who aided me greatly in the preparation of my MS. for the printers.

Cyrestes irmæ, mihi, sp. nov.—Intermediate between *C. methypsea* and

C. penthesilia; fore-wings with the markings of the latter species, hind-wings most like *methypsea*, but with a broader external black margin; under side similar to that species, but with the white marginal line more deeply scalloped and better marked, and the pale markings generally whiter. Sumatra. Palembang Residency. No. 413. Named in honour of the wife and elder daughter of Surgeon Julius Machik, of the Dutch-Indian army.

Papilionidæ.

Ixias flavipennis, Smith, sp. nov.—Upper side: both wings orange-yellow; from the base, extended over about two-thirds of the wings, shaded with gray, the nervures and remainder of the wings dark brown. Under side: both wings yellow, mottled with brown; anterior wing, with a black spot at the end of the cell, and an irregular sub-marginal row of brown spots confluent, extending from the costa to the inner angle; posterior wing with a sub-marginal row of brown spots commencing on the costa between the nervures and extending to the third median nervule, and a black spot on the first disco-cellular nervule. Expansion, $2\frac{1}{8}$ inches. Hab., Mount Dempo, 4600 feet. Type in Mus. H. G. Smith, Esq.

Amnosia eudamia ♀, Smith, sp. nov.—Upper side: both wings brown; anterior wings crossed from the centre of the costa to the inner angle by a broad brownish-white band, beyond the band the wings are darker brown; posterior wings, with a sub-marginal row of five spots (smaller than in *decora* ♀), outside of which are two irregular dark brown lines, and inside one dark line. Under side: both wings lighter brown than on the upper side, with similar markings to *decora*, of which it may be a variety, but it differs from the female *decora* in the lighter shade of the brown on the upper side of the wings, in the colour of the band on the anterior wings, in the size of the spots on the posterior wings, and on the under side in the absence of the three spots within the cell of the posterior wing, and of the first of the four sub-apical spots on the anterior wing of *decora*, and, in addition, it is somewhat larger. Expansion, 3¼ inches. Hab., Sumatra. Type in Mus. H. G. Smith, Esq.

Papilio forbesi, Smith, *Ento. Month. Mag.* p. 234 (1882-83).—Upper side: dark brown, almost black, the margins between the nervures with lunular white spots, very narrow on anterior wing, much broader on posterior wing, which is without tails; anterior wings with longitudinal rays on each side of the nervures of light brown, extending from the middle to the exterior margin; posterior wing with a row of three brownish-gray lunular spots between the median nervules, and a spot at the anal angle, above which is a row of three small faintly-marked spots of same colour. Under side: anterior wings rayed as above, but paler; posterior wing with a longitudinal red spot at the base, divided by the precostal nervure, which is black, and a small red spot below the costal nervure; a broad band of ochreous yellow, with a row of black spots in the middle, extending across the wing between the median nervules, and a small spot of ochreous yellow beyond; a black spot at the top of the band next the anal angle, three blue spots near the exterior margin, from the costal nervure to the median nervule. Expansion, 4 inches. Hab. Banding Agong, Sumatra. This species belongs to the Memnon group, in which, however, there is nothing which resembles it. Type in Mus. H. G. Smith, Esq.

Papilio alboline atus, mihi, sp. nov.—Allied to *P. saturnus*, Guér. (*nephelus*, De Haan); differs from that species in the greater width of

the sub-apical creamy-white band on the fore-wing (the five spots of which it is formed being considerably longer), in having an additional spot of the same colour at the apex of the cell, and two small, pale ochreous spots on the hind margin. The hind wings have the discal creamy-white patch straight on its inner edge, and continued to the abdominal margin by two additional pale ochreous spots; the marginal spots of both wings are also more strongly marked. The under side differs in having the white markings generally more extended, and the additional spot in the cell of the fore-wings as on the upper side. Hab. Borneo. In col. Brit. Museum.

In comparing an example of *Papilio saturnus* taken in Sumatra with the specimens in the British Museum, I found this nearly-related species unnamed in the collection, which the authorities have kindly permitted me to describe here.

Papilio itam-puti, Butler, sp. nov.—Allied to *P. alcibiades*, but the black markings on the primaries much broader, the fourth band forming an acute triangle; the external black border, occupying nearly a third of the wing not completely divided by the green band (which is narrower than in *P. alcibiades*), its inner edge sub-sigmoidal; this border terminates just below the first median branches, not at the external angle as in *P. alcibiades*; the secondaries have slightly longer tails, and the externo-anal area is greenish-gray, with black outer margin, and two black bars near the extremity of the median interspaces; on the under surface, in addition to the differences noted above, the outer half of the discoidal cell of the primaries is ochre-yellow, and the external half of the secondaries is uniformly instead of partially ochreous. Expanse of wings, 77 millim. Lampongs. In col. Brit. Musuem.

Description of a new Longicorn Coleopteron.

By Charles O. Waterhouse, F.Z.S.

Lamiidæ

Megacriodes forbesii.

From the *Annals and Magazine of Natural History* for May, 1881, and figured in Janson's *Aids to the Identification of Insects.*

Niger, nitidus, pube subtilissima cinerea indutus; thoracis disco macula oculata crocea ornato; elytris basi et sub humeros crebre granulosis, plagis sex albis ornatis. Long. 22 lin.

Near to *M. Saundersii*, Pascoe (Trans. Ent. Soc. 3rd ser. iii. p. 272, 1866); but, judging from the figure (pl. xii. fig. 1), it is a more robust species. It differs chiefly in having the base of the elytra and all the humeral region thickly studded with shining granules. The scutellum is yellow. Each elytron has three patches of white pubescence (which were doubtless yellow when the insect was alive)—the first and second placed as in *M. Saundersii*, but very irregular in form; the third very elongate, and as if formed of the two apical spots of *M. Saundersii*. The underside is clothed with yellowish-grey pile, with a broad stripe along the side from behind the eye to the apical segment of the abdomen; this stripe is part yellow and part white; it was probably yellow when the specimen was alive.

Hab. Lampongs, Sumatra (*H. O. Forbes*). Brit. Museum Coll.

New Rhynchota. *By* W. L. Distant, F.L.S.

(From the *Ento. Month. Mag.* xix. pp. 156-160.)

The following descriptions refer to species which I have received during the last few years in collections made by Mr. Forbes. Our present information as to the *Rhynchota* of Sumatra is greatly due to Snellen van Vollenhoven, whose studies, however, did not extend to the *Coreidæ* of this island; to Ellenrieder, who alone treated of the *Pentatomidæ*; to various descriptions by the late Dr. Stål; and the same, in a much less satisfactory sense, of the late Mr. Walker. It will be thus seen that at present our catalogues and collections of Sumatran *Rhynchota* are of the most meagre and superficial character though we may reasonably hope that this comparative ignorance will soon be greatly modified by the publication of the natural history section of the late Dutch Expedition into Central Sumatra. [This work has now been completed, and contains descriptions of many species new to science. H. O. F.]

Hemiptera-Heteroptera.

Pentatomidæ.

Canthecona cognata, n. sp.,* allied to *C. javanica*—*Ent. M. Mag.*, p. 157.
Neosalica n. gen., allied to *Piezosternum*. *Loc. cit.* p. 157.
„ *forbesi*, n. sp. *Loc. cit.* p. 157.

Pyrrhocoridæ.

Lohita grandis, Gray, var. *Sumatrana*. *Loc. cit.* 158.

Reduviidæ.

Panthous cocalus, n. sp. allied to *P. dædalus*, Stål, and *P. nigriceps*, Reut. *Loc. cit.* p. 158.
Panthous talus, n. sp., allied to *P. icarus*, Stål. *Loc. cit.* p. 159.

Hemiptera-Homoptera.

Cercopidæ.

Cosmoscarta juno, n. sp., allied to *C. viridans*, Guér. *Loc. cit.* p. 160.

* The descriptions of these species are given in full at the given pages of the work cited. H. O. F.

IV. ADDITIONS TO THE FLORA OF SUMATRA.

Description of a new Vaccinium. *By* William Fawcett, B.Sc., F.L.S.

Vaccinium Forbesii (sp. nov.). Herb. Forbes. in Mus. Brit., No. 2371.

Frutex aut arbor ramulis racemis calycibusque pubescentibus, foliis brevi-petiolatis ellipticis utrinque obtusis 13 mm. longis racemis marginibus recurvis integris coriaceis glabris subtus rufis imbricatis, 38 mm. longis terminalibus, floribus breve-pedicellatis, in axillis bracteorum

VACCINIUM FORBESII.

foliis paullo minorum, calyce 3 mm. longo lobis tubi longitudine obtusis, corolla 5–7 mm. longa ovoido-tubulari extus vix pubescente aut glabra intus pubescente rubra aut coccinea marginibus albis (H. O. F.), filamentis staminum pilosis, loculis antherarum ellipticis minutissimis spinulis tectis dorso exaristatis in tubulos breves rectos apice apertos

productis; disco epigyno pubescente extrorsum sinuato; bacca 5 mm. longa globoso pubescente purpureo-nigra.

This species differs from *V. buxifolium* especially in the bracts being like the leaves and not much smaller, and in the anthers being without spurs. This beautiful species was collected on Mount Dempo, from 7500–10,500 feet. In size it varied from a tree four feet in circumference to a low shrub.

[This drawing has been done for me by Mr. R. Morgan, from a camera drawing of the author's made from the living plant. H. O. F.]

Description of a new species of CYRTANDREÆ. *By* H. O. FORBES.

[Extracted from the *Linnean Society's Journal—Botany*, vol. xix. p. 297.

BOEA TREUBII, *Forbes.*—Suffruticosa, caule usque ad 3—4 pedes alto, pallide cinnamomeo-tomentoso: foliis oppositis, breviter petiolatis, elongato-lanceolatis, supra glabratis, subtus cinnamomeo-tomentosis; pedunculis multifloris, in paniculam terminalem abeuntibus; corolla in diam. 0·20–0·25 metr. purpurascenti-cærulea.

Folia acuminata, serrulata, undulata; petioli connati, basi dilatati, caulem amplectentes. Bracteæ inferiores, foliis similes, sed minores. Calyx 5-partitus; laciniis lanceolatis, acuminatis, tomentosis. Corolla oblique campanulata, tubus calyce brevior; limbus bilabiatus, lobis obovato-rotundatis. Stamina 2 perfecta, corolla multo breviora, 2-3 rudimentaria; filamenta arcuata; antheræ magnæ, cordato-oblongæ, reniformes, aurantiacæ, apicibus cohærentes, loculis suberectis confluentibus. Capsula ovoideo-cylindrica, bivalvis, valvis etiam in capsula perjuveni spiraliter dextrorsum tortis, loculicide dehiscens; placentæ membranaceæ, 2-fidæ, revolutæ, semina minuta integentes.

Sumatra, in monte calcareo Karangnata, prope Napal Litjin, in provincia Palembang, alt. 1000 ped.

I found this singularly beautiful and graceful plant in full flower in November, 1881, first near the village of Napal Litjin, 580 feet above the sea; but in profusion on the large disrupted calcareous blocks near the summit of the peak of Karangnata, in company with magnificent spike-bearing Cælogynes and pink-fruited *Melastomaceæ*. I am not satisfied that *Boea Treubii* may not form a new genus; it differs from *Boea* in its large size and entire stigma. The specific name is give in honour of Dr. Treub, Director of the Botanic Gardens, Buitenzorg.

PART IV.

IN THE MOLUCCAS AND IN TIMOR-LAUT.

CHAPTER I.

FROM JAVA TO AMBOINA.

Sojourn in Buitenzorg, Java—Leave for Amboina accompanied by my wife—Friends on board—Call at Samarang and Sourabaya in Java—Macassar in Celebes—Bima in Sumbawa—Larantuka in Flores—Cupang and Dilly in Timor—Banda, the island of nutmeg gardens.

ARRIVING in Batavia from Sumatra on the 27th of December, 1881, I was engaged for many weeks in botanical investigations in the Laboratory of the Buitenzorg Botanical Gardens, in packing up my very large Herbarium, and in making the necessary arrangements for my expedition to Timor-laut.

At the end of March, the future companion of my travels arrived from Europe, to whom I was married on the 5th of April, and henceforth the record of those wanderings must pass from the singular to the plural pronoun, while the observations hereunder recorded are those sometimes of the one, sometimes of the other of us.

On the 15th of the month we left Batavia *en route* for Timor-laut *viâ* Amboina. On board the steamer there was a large complement of passengers, among whom was Major Van der Weide, the directing medical officer of the Moluccas, and a most charming Portuguese family, that of Major da França, who was on his way to assume the Governorship of their possessions in East-Timor.

The steamers of the Netherlands India Company circumnavigate the Archipelago every month; and as they often lie to as long as a couple of days at the more important islands along its southern belt, we had therefore the opportunity of forming a slight acquaintance with many interesting places and races of men. After a call at the two Javan ports of Samarang and Sourabaya, we anchored for several days in

Macassar, the greatest disseminator in these seas of the products of Western civilisation to the barbarous East. Thence, running a day and night's sail southward to the island of Sumbawa, we touched for a few hours at Bima. The rest of that day and till next afternoon we coasted along the shores of the island of Flores, the Land of Flowers of the early Portuguese navigators, but a heavy mist concealed from our view its wooded features.

Anchoring at Larantuka at its eastern point, I accompanied the captain on shore under a dense rain, and spent an hour or two at a lone monastery there, where some eight or nine priests were living, who hospitably proffered us the best of their cellar. The buildings and grounds were enclosed and strongly fenced in by thick hedges of the impenetrable bamboo-durie. With a few people from Java and the surrounding islands they were spending their lives in very much like useless solitude. The natives were anything but friendly, and lived far in the mountains; but every now and then, the priests told me, they made a raid on their establishment, shooting a few of their people in the dark and then running away. So that it seemed to me that both the priests and the nuns (who occupied an adjacent nunnery) might have established themselves in a region affording more scope to their self-denying labours. The natives I saw were mop-haired, with sooty black skins; they wore triton-shell armlets, squeezed on just below the shoulder so tight that I was astonished that strangulation of the limb was not the result. A pink Periwinkle (*Vinca rosea*), and the lovely dark blue climbing *Clitorea ternatensis* grew abundantly near the shore and in the gardens of the priests.

From Larantuka passing southward through the Flores straits we made for Cupang in the west of Timor—a bright clean, neatly laid-out town at the base of a range of abrupt hills, with a considerable Dutch population living in substantial houses. On going ashore we were delighted to find there an Englishman, Mr. Drysdale, by whom we were most hospitably entertained during the day. The natives, tall well-made fellows with their hair done up in a large frizzly mop, strolled lazily about the streets looking on unconcernedly at the tide of civilisation and the eager bustle of trade set

flowing by the arrival of our steamer, as if it was a matter in which they had absolutely no interest or concern. They wore little clothing beyond a loin-cloth, and a fringed plaid —that simplest and most primitive garb of man—about their shoulders; a little bag, heavily ornamented with gold and beads, suspended in front by a string round the hips, contained their betel nut and siri leaves, and tastefully carved bamboo tubes full of tobacco. A Borassus palm leaf for an umbrella completed their costume and accoutrements, except their hats, which, made out of the pure white spathe of the Borassus palm, really exhibit artistic taste of a very high order. Somewhat of the shape of the "Devonshire Hat," so much worn a few years ago, but narrower in proportion, they were elaborately ornamented with a mass of flowers and plumes really wonderfully modelled out of little chips of the spathe. Held in the hand they were singularly graceful ornaments; but atop of the natives' curly mops they had rather a grotesque appearance. The indigenes rarely came down from their own mountain homes to the town, so that very few of the natives I saw crowding the streets of Cupang were true Timorese, Mr. Drysdale told me; most of them were men from the little island of Solor, and are the servants and coolies of the place.

SOLOR ORNAMENTATION.

Trade is carried on by barter, the most prized article of exchange being a species of bead, by no means plentiful, called by them *lakkai*, of an ochreous red colour, evidently some sort of soft stone. Whence these beads come is quite unknown, and no imitation yet made in Birmingham or elsewhere has been sufficiently exact to deceive the native to give the price of the true article for its counterfeit—a small string of eight or nine inches long costing over £12.

Another night's sail brought us to Dilly, the capital of the Portuguese territory in the east half of the island. Here we lost our genial companions, the Governor and his family, who

landed under a salute from the fort, and with a great show of ceremony. Landing later in the day, we perambulated the town, which wanted much before it could be termed neat or clean or other than dilapidated, but when we afterwards came to know how terribly insalubrious it is, we were surprised that the incessant fever and languor which made life on the lowlands an absolute burden left a particle of energy in anybody to care for anything. The supreme evil of Dilly is its having been built on a low morass, when it might have stood far more salubriously on the easily accessible slopes close behind it. Before leaving we received from the Governor a most cordial invitation to visit them again, and the generous offer of what assistance I might want, should I have a mind to travel in the interior of the island.

A sail of two nights and a day brought us to Banda. Coming on deck, before breakfast, we found ourselves slowly steaming in through a narrow winding entrance between thickly foliaged cliffs, which seemed, after giving us passage, to glide together and enclose us within a deep blue inland lake without entrance or exit. It was the most lovely spot we had yet visited. Fronting us as the steamer warped itself to the jetty, lay the town as a cluster of white houses, built along the low, narrow foreshore, overshadowed on all sides by steep heights densely wooded with bright green vegetation; from an elevated plateau, a battlemented fort overlooked us, the scarlet of its Dutch ensign floating in the wind with a bright gleam of colour; behind us, across the harbour, rose, from the water's bayleted edge, the high symmetrical islet cone of the Gunung Api, its base and flanks green with trees, amid whose shade a white dwelling here and there peeped out, peacefully reposing, careless of the internal fires that blistered the smouldering summit of the mountain.

We walked through the town and viewed at Bin Saleh's many native-made Paradise and thousands of other gay New Guinea birds' skins, ready for dispatch to the Paris markets. Two skins of the *Seleucides alba* and *Diphyllodes respublica* were all that were worth purchasing. We were charmed with its clean aspect, its green parks with gravelled walks, and pretty dwellings. Wandering up the heights by a path overgrown with lycopods and ferns, we presently found ourselves

under a delightfully shady canopy of tall Kanary trees, and among the groves of Nutmeg of which Banda is the famous garden. Quite a picturesque object in the wood was a boy busy gathering the fruit into a neat creel, with a jointed pole like a fishing-rod, nipping off the stalk of the ripe nuts by two claw-like prongs with which the tip of his rod was armed, when they dropped into a little basket-like cage worked to the stem a few inches below. He came and showed us his basketful of beautiful fruit —in its pale yellow shell, half of which is left on, in which was nestling the dark brown nut embroidered with its deep lake mace. This fruit is the favourite food of the large pigeons (*Carpophaga concinna*) whose low booming note was one of the few bird sounds that broke the stillness of the woods. I shot, however, a lovely green dove (*Ptilopus diadematus*) and a little White-eye (*Zosterops chloris*), and noticed traces of the Cassowaries that have been introduced from New Guinea, which are said to be now breeding there.

NUTMEG-GATHERER'S COLLECTING ROD.

Farther on we came on one of the plantation-houses, where a large number of men and women were peeling the mace, drying it in the sun, and packing both in boxes. These cases are all made of one size, carefully finished and caulked, and form as delightful an article of cargo as could be wished. None but a trade *de luxe* would befit an island so ornate and so wonderfully situated as Banda. Its produce, grown in beautiful bowers, is gathered up round its umbrageous bayleted shores in long gaudily-painted praus, which are constantly darting about propelled by lithe rowers, who, as is their custom, synchronously plunge and flash out their paddles in the sun to a buoyant merry tune, and in whose preparation or shipment not one hand-soiling operation is required; its atmosphere is charged with aromatic exhalations; its wharfs and streets are the picture of tidiness, and the very water that laps its coral shores is brighter and purer than almost anywhere else in the world.

A night's slow steaming brought us to Amboina.

CHAPTER II.

AMBOINA.

Amboina—Reception by Mr. Resident Riedel—Delay—Visit interior of Amboina—Paso—Move to Wai—The people there—The flora and fauna—Return to Amboina.

On landing in Amboina, I sent my letters of introduction from the Government to Mr. Resident Riedel, and later in the day we reported our arrival in person at his house. My letters recommended me officially to him for whatever information he could give us in regard to Timor-laut; and in that liberal spirit in which all travellers in the Archipelago are treated by the Dutch Government, I had been granted the privilege also of using the voyages thither of the Government's marine gunboat, which the authorities in Batavia expected would be leaving Amboina for the Tenimber Islands shortly after our arrival there. To our surprise, Mr. Riedel's bearing towards us was not at all friendly, and beyond the simple item that the *Tagal* had just returned thence, we obtained no further information as to its movements or intelligence from him about Timor-laut.

Taking leave of the Resident very disappointed, as I had relied much on the information that could have been given us, we set about searching for some shelter for the night. Knowing no one in a town where there is neither hotel nor "Rooms to be let" for chance travellers, we returned at sundown unsuccessful on board the steamer which fortunately had not sailed. Resuming our search next morning, we happily at nightfall met with the Captain of the Chinese, who, with the utmost kindness, placed a newly-built house of his at our disposal, and made it habitable for us.

Our first impressions of Amboina, therefore, were by no

means prepossessing; they would have been brighter could we have foreseen that, ere we left it, we were to make many delightful friends, whose kindness and hospitality would fix it in our remembrance as one of the most pleasant of towns to reside in.

Our only means now of reaching the Tenimber Islands was by the Netherlands tri-monthly steamer, due on the 18th of June, which had lately begun to run to New Guinea, touching at Serah and Larat, both islets of the Timor-laut group, where the Government had just then placed Postholders (civil officials of subordinate rank) charged with the initiatory work of these new colonies.

To a naturalist with a spare week or two at his disposal, few islands can offer so acceptable a retreat as Amboina. To spend the time as profitably as possible, therefore, we decided to move a little distance into the interior.

May 14*th*. Breathless Sunday morning. Started for Paso, a little village situated at the top of the Bay of Amboina, on the narrow isthmus—only a few hundred yards broad—that connects the southern or Leitimor with the northern (called Hitu) portion of the island. It was a disappointment to us that a ripple on the water quite prevented our getting a glimpse of those fairy Gardens of the Sea to be seen here, which have been so graphically described by Mr. Wallace. Jutting out from the land along the shores of the bay were the curious *Seros* or native fish-maises, in which a double line of close bamboo palisades, reaching above the level of the water, enclosed a lane, which extended shorewards from its seaward entrance a little way beyond low-water mark, and doubling back terminated in deep water in a circular well, where the fish that had entered during high tide, and whose escape had been prevented by the ebb, were enclosed and captured from a trap door in a little platform erected over it.

As we skirted along the shore, the sound of sacred music floated out to us over the water from one of the little villages in solemn and impressive cadence. We landed for a little to look at the church whence it issued—the people here being all "Orang Sirani," or Christians.* The congregation was just dispersing, and we were surprised at the neatness of their

* Or "Nazarenes."

attire ; the men in badjos (a sort of blouse) and trousers of black glazed calico, and the women in black sarongs (petticoat) and kabaias (a loose tunic with sleeves). Their demeanour was becomingly grave and solemn, like their dress. The parson, however, looked an odd figure in a white tie, a European dress-coat never made for him, black pants of uncertain age, and a tall narrow-rimmed beaver hat. Their church was fitted up like a Dutch or a Scottish country kirk, and had been entirely erected by the villagers, who, according to custom, each contributed their share of its cost in labour or material.

On arrival at Paso, we found the Rajah (the chief of the village, an official appointed by the Government without any territorial possession) preparing to leave for a week to attend some great native festival in a neighbouring village, but he has kindly offered us a room in his house. He remembers Mr. Wallace, who visited Paso in the time of his father (who was also Rajah), Beccari, Macleay, and the officers of the *Challenger*, who had all occupied his house, he informs us.

May 15*th*. The Rajah, and a great part of the villagers with him, left this forenoon. The last thing done before starting was to rake and tidy the space in front of the church, "for if proper respect were not paid to Tuan Allah, perhaps some misfortune might befall one or other of the praus." The final start for the boats was made from the church door. Their belief in the avenging nature of the deity is very strong.

A *Strobilanthes* hedge-girt path in front of the Rajah's house leads straight to the Bay of Baguala, along the isthmus, which is nothing but a sandbank recently raised from the sea.

Along the S.E. shore of Leytimor I observe precipitous cliffs of coral from 200 to 300 feet in height *in situ*, indicating a considerable amount of elevation. The Bay of Baguala is at this season very calm, but a month hence the natives say the monsoon will have changed, and it will be difficult for boats to come in. Now, however, the scene is a very lively one at all hours of the day, for the traders bringing sago-meal, fish and fruits from Ceram, Saparua, Nusa-lau and the N.E. shores of Amboina are hurrying before the change of weather to bring over their produce to Amboina, and get back again with their exchanges. On arriving in the Baguala Bay their boats have to be all unloaded, and dragged over the narrow isthmus into a

creek of the Amboina Bay, which at high water is only a few yards distant; and as the constant unpacking and repacking is accompanied by shouting and singing to the beating of a tom-tom, without which no work can be done here as it times them to concerted action, Paso is anything but dull.

May 21. Lopes and Peter as usual out hunting for birds, while I went to the forest to botanise; Anna labelling the insects and birds at home. The fine Ornithoptera, the Kupu-Kupu rajah or royal butterflies, for which this island is famous, are very difficult to catch, as they fly at so great a height; nevertheless the large green *O. priamus*, and *O. remus*, have been obtained feeding on the *Cerbera lacturia* and *C. odallam*. I have on several occasions found the bodiless wings of the *priamus* in the forest paths, as if it had been attacked by birds, the body devoured and the wings dropped. Nowhere have I seen insect life—especially beetles—so abundant, or of greater variety and beauty, as here; one of the less rare species is the grand Sagueir (palm-wine) feeding-beetle, *Euchirus longimanus*, figured by Mr. Wallace in his Malay Archipelago, which perish in thousands every year by dropping, generally during the night, into the palm-wine collecting buckets whence they cannot escape.

Coming as I have done from the Indo-Malayan part of the Archipelago the new character of the fauna has greatly pleased me. Gay parrots I had counted on seeing; but the unexpected richness of the plumage of the pigeons has been a special delight to us at every return of our hunters. The Marsupial species of *Cuscus* also, of which we have obtained three species, have interested us. They are very plentiful, and at this season the females all seem to have a little one in their pouch. One of these was a tiny creature about two inches long, quite hidden in its pouch, fixed by its lips formed into a simple round orifice to its mother's teat. They are much eaten by the natives, by whom they are caught in nooses set in the trees, or by artifice In moonlight nights creeping stealthily to the foot of a tree where they have observed one sleeping, taking care not to lift their heads so that the light flash in their eyes, they imitate at short intervals its cry by placing the fingers in the nose; the *Cuscus* descends and is fallen on by the watchers below. The python is their greatest enemy, and devours large numbers of

them as they cling to the branches during the day in a semi-torpid condition.

Heavy rain fell for several hours this afternoon, and suddenly set a patch of forest near the house alive with a loud hoarse uproar of tree-frogs, that continued without intermission till long after sunset. Last night, as we were falling asleep, a colony of a different species, residing in the "atap," (thatch) of the rajah's house, set up an irritating, harsh croupy bark like a little cur's, repeated every two or three seconds till break of day, quite disturbing our rest. I roused Lopes several times to beat the thatch, but they would not be persuaded to cease croaking.

May 24th. This morning at four o'clock got up and beat a vigorous tatoo on the rajah's "bedug" (drum) to assemble the rowers who had agreed to row us to Tengah-tengah on our way to Wai, and with whom it had taken me the whole of yesterday to come to terms as to a boat and its hire. On mustering our crew half of them failed to put in an appearance, sending word that they did not now wish to go. New men therefore had to be found and terms discussed with them; and even with them much time was lost, as during the loading of the boat they took every opportunity of slinking off to their homes, whence they had to be routed out over and over again. This is an exhibition of the Sirani in their true character—at least, the side of it they oftenest show, lazy, untruthful, arrogant and void of conscience. Having abjured the Mahomedan religion for that of the Europeans—in form—and acquired some words of their language, they consider themselves quite the equals of the Dutch. Their change of religion has done much for them, in many ways, as a community, but little for them individually. They can be excessively tantalising; and both as traders or servants I find them less honest hearted and reliable than their Islamite brethren.

At length got under weigh at eight o'clock in an "orembai" with six rowers, a helmsman, and a man to beat the drum. We skirted the northern shore of the Baguala Bay, and landed in a little baylet in its promontory, where the village of Tengah-tengah lies built up in terraces from the shore. These terraces are lined by thick rows of the true Bread-fruit tree (*Artocarpus incisa*), whose produce, the rajah tells me, brings in some £400

a year to the village. The people are Mahomedans, and their language was quite unintelligible to us, being the *bahasa negorai* or the old language of the country, which the Sirani consider it beneath them to speak, just as they imagine it derogatory to their more elevated position as Sirani to wear the head-cloth and Malay sarong. The largest edifice in the village is the Baluai, the council room, where the rajah, the priests, and the chiefs of the village hold their deliberations. The rajah of Paso told me that his Baluai had fallen to ruins, but as the old *bahasa*, which they had quite discarded, might alone be spoken in it, they could not rebuild it. The Baluai corresponds very nearly with the Balai of Sumatra, and both words have probably a Polynesian origin. The manners of the villagers here are simpler and far less haughty than those of the Sirani; but they seem poorer and less advanced in civilised ways.

After some delay, but without any unpleasantness, we obtained a boat and rowers and started for Wai. From Tengah-tengah we sailed through what might have been a bay in Fairyland: the coral gardens beneath our keel, so beautiful that we found it difficult to proceed far without bidding our rowers to rest on their oars to let us admire each more wonderful spot; around us the white shore line, in front of a dark green palm-fringe; behind us the island of Haruku embowered in foliage, and the distant peaks of Ceram. When at length we ran our prau on the shore in the mid-afternoon in front of the village of Wai, the unreal nature of the scene seemed complete, so buried was the place in sleep,—not a moving creature was to be seen anywhere on the shore or in the village, not a soumd of life broke the stillness of its tree-shaded "straats," not the bark of a dog, or the note of a bird from among the trees, whose branches hung listless in the broiling sun. So heavy lay the death-like silence on all around that we felt as if we ought not to speak above a whisper, or to tread except on tip-toe, as, led by one of our boatmen, we slowly made our way to the house of the rajah, who, after a time, appeared in his sleeping attire, in a half-bewildered and confused state at finding a couple of white strangers in his verandah. At last, when he had slowly grasped the reason of our unexpected advent, we came to terms with him for an unoccupied house of his a few doors from

his own, and it was curious to observe the surprised air of the people as they roused themselves to watch our installation.

Though built of stone in the European style, our new abode with its damp sand-floor, is not to be compared for comfort with a bamboo pile-hut. It has one splendid accessory in a large bath-house erected in a secluded spot over a stream widened out and enclosed where it issues from the base of the Silahutu mountain, and above where the villagers are permitted to use it.

Sunday, May 28th. Strolled out together in the early morning by the shady paths of the neighbouring forest, and back to the village along the bay whose charming view never ceases to afford us unmixed delight, and on whose beach the east wind, now begun to blow roughly, has been throwing a wealth of sponges, hydroids, and shells among which there is always something new to us, and where we spend many hours of our walks in watching the painted fields of shore crabs (*Gelasimus*) with their richly coloured pincer limbs and carapace, the restless chattering Flycatchers (*Myiagra galeata*) and the sedate Kingfishers on the Mangroves watching for little crustacea, and those curious fishes (*Periophthalmus*) that hop along the shore out of the water in such an odd way.

The village is laid out in rectangular plots fenced in by *Strobilanthes* hedges, in which are set the gated entrances to garden-fronted houses. The streets, lined with overarching trees, are margined along their water conduits by borders of pink crocus-like plants. One of its chief edifices is the *Gredja*, whose grandeur quite overwhelmed us; for it is far more elaborately decorated than many a rural parish church at home. The area of the building is set with cane-bottomed chairs instead of fixed pews; but on one side, raised a few feet above the floor, a large, canopied, elaborately carved and richly gilded suite of seats, emblazoned in front with a coat of arms (!), is reserved for the rajah and his family. The pulpit is also much carved and gilded, and the church altogether is tastefully fitted and abundantly lighted with petroleum lamps. The services are conducted in High Malay by a European missionary, and in his absence by the *Guru* or native schoolmaster, who with moderate regularity instructs the children five days a week. Amboinese rajahs keep no state, and wear

no special dress except on Sundays. To-day we had the honour of seeing the Potentate of Wai proceed to church in state, in his black trousers—which, being rather short, displayed a good deal of white cotton stocking—black 'swallow-tail' coat made for a stouter and taller individual than himself, probably his father, and a beaver hat, tall and narrow, of an ancient pattern, while over his head a youth carried his gilded state umbrella. The whole population attended the service, all of them in black calico attire; but their religion seems to lie on them like an awesome thraldom.

June 8th. Began packing up in order to return to Amboina in time for the Timor-laut steamer of the 16th. We have had a delightful sojourn here notwithstanding the heavy rains that set in soon after our arrival, which prevented me much to my regret, from reaching the summit of Silahutu. The later hours of every afternoon have been looked forward to by us both as the most pleasant of the day, when the hunters' spoils were displayed to be admired, examined and labelled. Among butterflies we have added a few more of the fine *Ornithoptera* found at Paso, numbers of "Swallow-tails," chief among them the deep blue *Papilio ulysses*, species of *Hebomoia* and *Pieris*, *Charaxes euryolus*, and many "Blues"; among beetles we have added to our collection many species of all the finest families, Longicorns, Rose-chafers, Tiger-beetles and golden *Buprestidæ*; among birds may be mentioned the beautiful raquet-tailed Kingfishers of the genus *Tanysiptera*, which I was rather surprised to find in large chattering corrobories in the tops of high trees; Malcos, whose terra-cotta eggs are eagerly hunted for by the natives as a table luxury; *Megalurus amboinensis*, an isabelline Reed-warbler found chirping among the tall Kussu grass; bright orange Thick-heads (*Pachycephala*), Lories, and among our favourite pigeons numbers of the beautiful black and cream-white nutmeg-eaters (*Myristicivora bicolor*) of which the little islet of Pulu Pombo, lying a few miles off the coast, is a densely populated columbarium. The most interesting of the plants are species of *Myrmecodia*, on which I have been able to continue the observations begun at Kosala in Java (see pages 79–82).

To-day I had a long talk with the rajah and some of the people of the neighbouring Mahomedan village, from whom I

have somewhat extended the Batumerah Vocabulary given by Mr. Wallace in the appendix to his Malay Archipelago.

Amboina, June 10th. Yesterday at daybreak left Wai to come here. As the state of the monsoon prevented our journeying to Paso by boat, we proceeded across the promontory on foot, our baggage carried by porters, and A—— in a palanquin. The road led over numerous small hills, from the top of which we got many pretty peeps of Haruku and Ceram, through Gum-tree—the famous Kajuput—forest and Kussu-grass fields, studded throughout with bright yellow Hibiscus-trees and with fragrant *Habenaria susannæ* orchids, while by the path-side grew bright Polygalas and delicate pink Sonerilas. The nectaries of the *Habenaria* averaged six inches in length, and though containing only a small drop of nectar at the bottom, I believe the flowers to be fertilised by a moth with a tongue far shorter than six inches. Descending into the Baguala Bay we skirted the shore all the way to Paso, where we found we must wait till afternoon for the rise of the tide. It was only after hours of bargaining and cajoling, and the assistance of the rajah's authority, we obtained (long after the tide had sufficiently risen) a boat and men to take us down the bay. This unnecessary delay did not tend to raise the Amboinese character in our estimation, especially as it had turned out a soaking night and so dark that we could not see where we were steering; while, to crown all, our boat was a very unsafe "dug-out" with no outriggers, in which we could not dare to beguile a part of the way in sleep for fear of capsizing it by an unguarded movement. Luckily the sea was as smooth as glass, and we kept ourselves awake watching the crickling rain and the drip of our paddles dancing into phosphorescent drops on the water, the luminous zig-zag path that the frightened fishes traced in darting from below our keel, and the flashing torches of the fishers arranging their Seros. Arriving about midnight utterly worn out, we were much annoyed to find the door of our old quarters unopened, and none of the preparations made which we had sent on Lopes—who was really never to be depended on out of our sight—in advance to see to; we pretty truly surmised that he had got "unco happy" among his friends and forgotten all about us. After a long wait in the rain the key was at last obtained by rousing up our kind old

Chinaman, and our baggage drenched in the rain and in the leakage of the boat, at length deposited under cover. Finding a boat-sail in one of the rooms, we were glad to throw ourselves upon it on the stone floor—a wretched night even for me, but worse for my companion, hardly yet inured to roughing it, and for whose sake I bitterly grudged such hardship in a town so civilised as Amboina

CHAPTER III.

FROM AMBOINA TO TIMOR-LAUT.

Leave for Timor-laut—Saparua—Curious village and atoll of Gessir—New Guinea—Aru—Ke—Timor-laut—First impressions—New birds and butterflies—State of siege—Negotiate for a house—Language—Our barter goods.

July 5th. On board the SS. *Amboina*. At last, at 5 A.M. "Full steam ahead"—for Timor-laut. Since the 10th of last month, after completing our stock of beads, knives, and the thousand and one knick-nacks bought pretty much on chance in the hope of their being good trade, we have been living with all our baggage packed and roped, expecting every hour the arrival of the New Guinea steamer—a period of intense discomfort and unrest. Before its arrival was announced we had quite concluded that some accident had befallen it. At last, however, we are on board, and have already forgotten our vexation in the keen satisfaction of being really on our way Eastward to the islands where we hope to find so many new forms of life.

Our enforced sojourn in the town was not altogether without pleasure. Amboina is one of the most salubrious of towns, and is charmingly laid out in arbour-like streets—very enjoyable in the evenings—which lead to the beach and to the grassy hills on the outskirts along the shores; while, being the head-quarters of a regiment of troops, music was discoursed twice a week on the plain in front of the Fort; and, having then no European acquaintances, we had leisure to look on at phases of Chinese, Arab, and native life, which, standing in the dark, gazing into lamp-lit churches, dwellings, shops, and gambling-houses, we could unnoticed interest ourselves in. On the day after the arrival of the Java mail that brought us the sad intelligence of the death of Mr. Darwin,

TENIMBER ISLANDS OR TIMOR LAUT

Compiled from the latest information
With corrections by M. H. C. Forbes

Scale of English Miles
10 0 10

Dotted line indicates region where the Author's collections were obtained

Longitude East from 30' Greenwich

Harper & Brothers New York

I was delighted to be hailed by Dr. Julius Machik, an old friend of mine in the Lampongs of Sumatra, who posted to the charge of the Military Hospital, had come with his family to reside here. His house was forthwith our constant rendezvous, and as he was a keen entomologist and ichthyologist, the rest of the time till our departure passed most pleasantly.

July 5th and 6th were spent in touching at Saparua, one of the Ceram group, and in lying for a day in our favourite port of Banda. Having steamed slowly during the next night we anchored in the morning of the 7th at Gessir, a mere horseshoe-shaped, cocoanut-fringed coral atoll, picturesquely showing its surface above the sea at the east end of Ceram. Once one of the most dreaded nests, and the secure hiding-place of pirates in these seas, it is now one of the busiest and most curious marts in the extreme East—a rich ethnological gallery, crowded with representatives and the handiwork of every race in the Archipelago, and dotted with Malay, Chinese and Buginese dwellings, each built after its own fashion. The houses are arranged in quadrangular blocks, each within a high fence, opening on to clean, carefully kept streets lighted by oil lamps on painted lamp-posts—all fresh as a new button.

It is the rendezvous of the Paradise- and other bird-skin collectors from the mainland of New Guinea, from Salwatty, Mysore, and Halmaheira, and of the pearl-divers of Aru; hither the tripang, tortoise-shell, beeswax, nutmegs, dammar, and other rich produce from a multitude of islands is brought to be exchanged with the Malay and Chinese traders, of Macassar, Singapore and Ternate, for the scarlet, blue, and white cottons and calicos of the Dutch and English looms, for the yellow-handled hoop-iron knives, which form the universal small change of these regions, and for beads, glass-balls, knobs of amber, old keys, scraps of iron, and worthless but gaudy Brummagem. At certain seasons it is quite a rich zoological garden. Here may often be seen in captivity Birds of Paradise of species never yet seen alive anywhere else out of their own lands, parrots, lories, cockatoos, crowned pigeons, cassowaries, tree kangaroos, and other animals which have managed to survive a journey thus far, but rarely farther west.

July 8th. New Guinea! This morning we find ourselves

gazing for the first time on the wooded shores of the land over which there lies such a halo of romance and mystery. It was with the intensest interest that we landed by scrambling up on the curious and shaky platforms which the Papuan projects far out into the sea as a foundation for his house, over which, on narrow planks of split bamboo and on rolling tree-trunks, guarding against falling into the sea through the constant vacuities, we made our way to the shore, which was but a narrow strip of land a few yards wide in front of high and perpendicular cliffs of rock.

We were surrounded at once by a crowd of tall, erect, frizzly-headed, well-disposed men and women, who found us most curious objects apparently. It was evident that they had but seldom seen white faces, for our colour interested them very much. They examined our legs, arms, and faces, rubbing them gently and looking at their fingers to see whether the colour came off or not; others, taking off the scanty head-cloth they wore, took our hands within its folds in a most reverential attitude. A——, probably the only white lady that has ever trod this northern part, was, however, *the* object of curiosity. After looking at her very intently for some time a thought suddenly seemed to strike two of their number, who, dashing away towards one of the houses, returned in a little leading between them an Albino woman with fair skin and yellowish hair, and placing her side by side us, burst into a hearty laugh, as much as to say, "We know now why your skins are white."

I observed that their dead were buried in the ground, in a mound-shaped grave. One was entirely curtained above and round four stakes driven into the ground; while another was surmounted by a skull.

After touching at Ke and Aru, we bore away south by west, and early on the morning of July the 13th we sighted the first of the Tenimber Islands, lying between 6°35′ and 8°25′ N. lat. and 130°30′ and 132° E. longitude; these were the higher lands of Molu and Vordate, beyond which the mainland of the larger island came into view as a low-lying country trending away southwards, presenting to our eyes, fresh from the majestic forests of the western regions of the Archipelago, by no means a very luxuriant vegetation.

When the islands were first discovered and the name Timor-laut or Tenimber first applied, I have not been able to discover. In Mercator's atlas of 1636, they are represented on a small scale in his map of the East Indian Islands. The first information we possess of a reliable kind is by Captain Owen Stanley, whose name is perpetuated in that magnificent pile of mountains in the south-east promontory of New Guinea, whose heights no white foot has yet ascended. In his 'Visits to the Islands in the Arafura Sea,' in 1839 (in Stokes' 'Discoveries in Australia') he says: "We sailed from Port Essington on March 18, 1839....Light airs prevented our clearing the harbour till the morning of the 19th, and at 3 P.M. on the 20th we made the land of Timor-laut. . . . At daylight on the 21st we made all sail to the northward . . . and anchored in 11 fathoms, sand and coral, three-quarters of a mile from the shore. On landing the contrast to the Australian shores [Captain Stanley approached from the opposite point of the compass from myself] we had so recently sailed from was very striking. We left a land covered with the monotonous interminable forest of the eucalyptus or gum tree, which from the peculiar structure of its leaf affords but little shelter from the tropical sun; shores fringed with impenetrable mangroves, . . . the natives black, the lowest in the scale of civilised life. . . . We landed on a beach, along which a luxuriant growth of cocoa-nut trees extended for more than a mile, under the shade of which were sheds neatly constructed of bamboo and thatched with palm-leaves, for the reception of their canoes. To our right a hill rose to a height of 400 feet covered with brilliant and varied vegetation so luxuriant as entirely to conceal the village (Oliliet) built on its summit. The natives who thronged the beach were of a light tawny colour, mostly fine athletic men with an intelligent expression of countenance."

With the exception of this meagre account we have no further information regarding Timor-laut for nearly thirty-eight years, when a vessel belonging to some Banda traders visited the island in 1877, an account of which is given in the Journal of the Royal Geographical Society for 1878 (p. 294), under the title of "Voyages of the Steamer *Egeron* in the Indian Archipelago, including the discovery of Egeron Strait in the Tenimber or Timor-laut Islands." These voyages were

undertaken chiefly for trade purposes. Mr. Hartog has the honour of being the first person to sail through the strait separating the north and south islands which bears the name of his vessel; but Captain Owen Stanley was really the first to indicate the existence of this strait; for in his 'Notes of a Cruise in the Eastern Archipelago in 1841–2,' which are to be found in the Journal of the same Society for 1842 (vol. xii. p. 263) he writes: "After leaving Baber, we made the island of Sera, on the west coast of Timor-laut, and then stood across for Australia. A good harbour is said to exist in the south part of Timor-laut, *which is separated from the north part by a deep channel.* Indeed," he continues, "I feel sure that when the island is properly examined, it will be found to consist of several islands separated by narrow channels."

As we drew nearer and nearer we carefully and anxiously watched the growing features of our new home. I observed that the much indented coast, a low and narrow foreshore covered with a thick forest of cocoa-nut trees and dark-green mangrove thickets, was fringed in most places with a precipitous bluff, on which principally the villages, whose houses glinted through the vegetation above them, were situated. At midday we entered the narrow strait between the mainland and the island of Larat, and anchored opposite the village of Ritabel. As soon as we had made fast, several boats—the foremost of them rather timidly—put out from both shores, and in a few minutes we were surroumded by a little fleet, whose occupants scrambled on board, talking and jabbering as only Papuans can, affording us an opportunity of forming some opinion of those who were to be our friends or foes for the next three months. They were powerful athletic fellows, and conducted themselves exceedingly well, apparently awed by what they saw on board of the marvellous things of civilisation. Their sole request was for *laru* or gin, the most-prized by them of all earthly commodities.

After depositing our baggage, our three servants and our two selves on the shore, the *Amboina* at once hoisted her anchor and bore away. We sat down on a chest and watched her grow less and less and disappear over the horizon, with feelings somewhat of desolation and not without some misgivings, left there the sole Europeans among a race of the very worst

reputation and without the possibility of communicating with civilisation for at least three months to come.

We found the Postholder a native of one of the Molucas Islands, left here by the Resident in the beginning of May, fairly well housed; but he told us he had suffered terribly from fever. He was good enough to let us a room, and to allow us to store our baggage under the verandah of his house till we should obtain one of our own. We then sauntered out through the village, which is situated on the foreshore against a cliff; the houses resembled those figured in Captain Owen Stanley's narrative already referred to. They were arranged more or less in irregular streets, with their gables as a rule to the sea, to allow of their praus being run up under them, though in many cases separate sheds were erected for them. All round the village we found a high strong palisade, with a portion removable, however, on the shore side in the daytime. In attempting to pass out by the landward gateway we were at once restrained by several of the villagers following us, who pointed to the ground in an excited manner, demonstrating to us its surface everywhere set with sharpened bamboo spikes, except along a narrow footpath. Their gestures instantly opened our eyes, with an unpleasant shock, to the truth that we were environed by enemies, and the village was standing on its defence.

Outside the gate we entered under a cocoa-nut forest, among ferns (*Asplenium*, *Pteris*, and *Polypodium*), Clerodendrons, low Solanums and Malvaceous shrubs, which grew densely over the coral foreshore of the island, in front of the abrupt cliffs, along whose sunny bases I saw several butterflies unknown to me and new to science; but—not possessing cuirassed limbs which could despise the bayonet crop that overspread the ground, from which in that climate even a slight wound produces often the most serious results—many of them defied our deftest attempts to ensnare. The first specimen I netted was a new Swallow-tail butterfly (*Papilio aberrans*), and the first beetle a gorgeous golden Buprestid (*Cyphogastra splendens*).

Turning in another direction, breaking through gigantic maises and walls of spiders' webs, we ascended the bluff of which I have spoken, on which grew some Papilionaceous trees of considerable height, along with Erythrinas and others I did

not know, but in their branches I espied the beautiful scarlet Lory (*Eos reticulata*), which, though it had been long known from these islands, I was perhaps the first European to see alive in its own country, and certainly the first to shoot there. During the same walk we were surprised to hear from a cocoa-nut tree near the village a most singular bawling, or caterwauling, which I thought must proceed from one of the children at play, but which I at last perceived to be produced by a new species of Honey-eater (*Philemon*), whose voice became familiar to us as the earliest and the latest sounds of the day. These observations raised high hopes in my breast as to what I yet might discover, for the species I had seen were almost all new.

The next sight was less exhilarating—on a tree-clad elevation the half-burned and recently deserted village of Ridol; and from the branch of a high tree before us a human arm, hacked out by the shoulder-blade dangled in the breeze, and at no great distance further were recently-gibbeted human heads and limbs.

A state of war, we found, existed between, on the one hand, the villagers of Ridol burnt out by the Kaleobar people, leagued with Waitidal on the north-western corner, which had taken them in, and with Ritabel, our village; and on the other hand, those of Kaleobar, one of the largest villages on the island situated on the north-eastern corner, which was leagued with Kelaan and with Lamdesar, two other villages on the south-eastern coast. Frequent raids had been made recently by these villages on Ritabel, the wife of whose chief had recently been picked off from the outside of the palisade by a lurking Kaleobar marksman, while many of the villagers showed us their recent wounds received in an attack made a few weeks before our arrival. The bamboo spikes in the ground round the village were set to prevent such clandestine approaches. During the day they were removed from the paths which led to their fields and wells, and at sunset, when the last man had returned to the village, the pathway was carefully reset, and the gateway barricaded for the night; it was the duty of the first goer-out in the morning to open the gate and remove the spikes. In this affray it was that the unfortunates, who owned the dismembered limbs we had seen, were captured. These grim mementoes did not inspire

either of us with the most pleasant reflections, but we determined to close our eyes on all but the bright side of the picture of which we had got a glimpse.

The villagers seemed perfectly well disposed towards us, without fear or suspicion of us. We ventured to look into their homes as we returned from our survey, and they beckoned us in with a smile.

Our first care was to obtain a house, and at once on our first morning I set about looking for a site. Those who know best what uncivilised ways are will understand our vexation at the difficulties now encountered, the excuses for refusing one spot after another, the whole-day palavers abandoned at night without result, and day after day for eight days. By a large present all round I had the satisfaction of at last cajoling the old men into deciding on a site lying within the tide mark, which forthwith was occupied before they could change their minds.

During the progress of the building which of necessity had to be a pile dwelling, and when my presence and actual help were not necessary, we made short excursions to the immediate neighbourhood on which we were always accompanied by some of the natives, who seemed to take the liveliest possible interest in our doings, and with whom we mixed as much as we could. Perceiving that I recorded their names for everything we encountered, they themselves adopted the *rôle* of teacher—the young women not less than the men—repeating to us the name of every tangible object, as well as trying to bring us to a comprehension of their expressions for abstract ideas. After some days they began regularly to catechise us in past lessons, bringing us various objects whose names they had already given us, and by signs requiring us to repeat to them their names, laughing heartily at us when we made a failure or a mispronunciation. The buttons on our garments formed excellent objects on which to teach us numeration, and many a score of times we have had to stand while some Venus-formed maiden encountering us in the village insisted on hearing us recount their tale again. So assiduous and apparently interested in our acquiring their language were they, that their willing lessons are to us now one of the most

pleasing reminiscences of these simple people. We of course very soon began to be able to hold some sort of converse with them in their own language, which resembled that spoken by the Ké Islanders; and through A——, who had become a great favourite with the people, caressed and affectionately patted by them in her wanderings about the village, we got to know much of their inner life.

We soon found that a great deal of the barter goods we had brought were of little use among these people. Only our German knives, cloths, and calico would be tradeable. Our beads they would not look at, they were too coarse and large; their taste lay in the small scarlet and blue sorts. I had brought a good many English sovereigns; they looked at them narrowly and weighed them, but would not trade in them. This I considered very strange, inasmuch as their most valued possessions were gold earrings. The explanation, however, I discovered later. The *Egeron's* master, it seems, had brought a quantity of false English gold made in Singapore, using them as barter articles with the people on his first voyages, and some of which they showed me. When they came to beat out these coins the deception was at once discovered, and during our visit it was impossible to pass a single gold piece. Had the natives had the certainty that the coins were genuine, they would have given many times their value in exchange, and, being easily transported, they ought to have formed our most valuable trade medium. We learned, too, what caused us considerable anxiety, that the islands produced practically no rice; nor was sago, as used on the other islands, to be had unless we could manufacture it ourselves from the trees. The products of the island from which the natives mainly obtained their food-supply were Indian corn, sweet potatoes, and a few species of legume, which was all we should have to fall back on if our own not very ample supplies ran short.

CHAPTER IV.

SOJOURN IN TIMOR-LAUT—*continued.*

The natives—Hair and coiffures—Vanity—Stature and living characteristics—Cranial characters—Clothing—Tjikalele dance—Arms—Marriage—Artistic skill—Individual and moral character—Treatment of their children—Games—Fine figures—Graves—Good butterfly resorts.

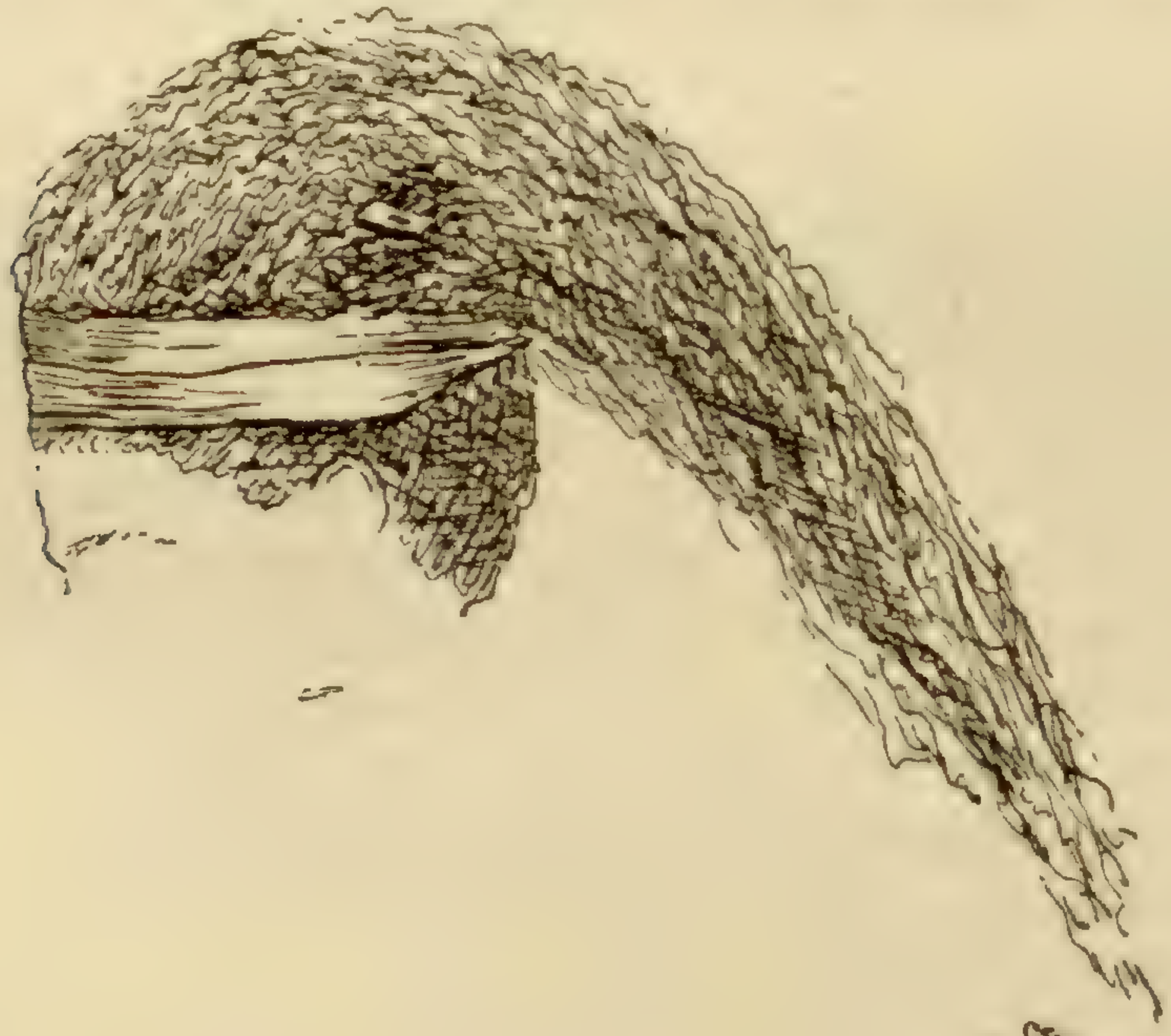
Many trying and vexatious delays—the laziness of the natives, quarrels in the village, and fear of attacks from our neighbours, which are easier to look back on from the midst of civilisation than to bear at the time, with equanimity—prevented our house, which taxed all our energies, from being finished till the nineteenth day after our arrival, and not till then was I able to commence making any close study of the surrounding country, or of its flora and fauna. But we had no useless time on our hands, everything was so new to us. The people that came about us to gaze, were all subjects deserving the closest study. Their every gesture and every custom had to be watched with microscopic acuteness, if we were to improve our opportunities and not fail in deciphering the story—only thus recorded and to be ere long blurred and blotted by foreign contact—of their race, incessantly being unfolded before us in their every unconscious word and commonest action.

All the natives of the islands we saw were handsome-featured fellows, lithe, tall, erect, and with splendidly formed bodies. They dyed their hair of a rich golden colour by a preparation made of cocoa-nut ash and lime, varying, however, in shade with the time, from a dirty grey through a red or russet colour, till the second day, when the approved tint appeared. Several modes of arranging their hair were in vogue. It was either carefully combed out, transfixed with a long fork-like comb, and confined within a single girdle of palm-leaf, or a black, red

and white patchwork band, was allowed to hang loose to the shoulders; or it was done up in a frizzed mop, different, however, from the unravellable matted wisp seen on the Papuans

COIFFURES OF THE NATIVES OF TIMOR-LAUT.

of Macluer Inlet in New Guinea, or among the Aru Islanders. Their coiffure seems to depend on the kind of hair, straight or frizzled, that Nature has given them; when frizzled it is

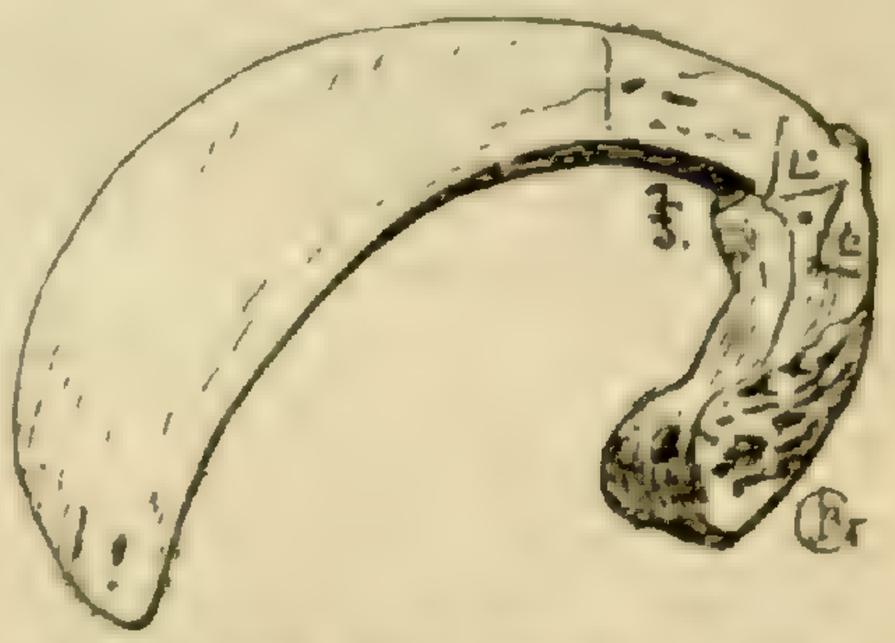


COIFFURE.

arranged in a mop, and when straight it is combed out and crimped with the instrument shown on page 309, to hang down the back in a "cataract." The arranging of their hair is one of their most enjoyed occupations, and the vanity with which

they bind it within various coloured bands—narrow above broad—laid one on another, before a mirror formed of water collected in the bottom of a prau, or on the calm sea-face itself, is most amusing to see. The men are very fond of having their hair cut quite short, as it no doubt relieves them for a time by reducing the population in that region of their bodies.

One day some of them seeing in our house a pair of scissors, eagerly begged its use for this purpose, whereupon one of them at once started as haircutter, and as soon as it was known that such operations were going on a crowd collected, and, sitting down in a row, waited for their turn. We tried to get some specimens of their locks, but when they saw that we desired to keep the portions we picked up, they became quite afraid, and excitedly demanded them back, for fear, as they said, they would die if they remained in our keeping. They gathered up every scrap, and had not a kind wind assisted us, and blown a few pieces to a little distance out of their sight, which A—— and I marked down noting the subject from which each had come, we could not have obtained a single specimen. In Sumatra I once saw a man most carefully bury the scraps after paring his finger-nails. It seems as if there existed in these countries a superstitious dread of any part of their person being in possession of another. One day, when I purchased from a man his father's skull, something of the same dread appeared; for as soon as the bargain was completed, the seller took from his *luru* (or siri-holder) a piece of areca-nut, and, setting the skull before him, he placed the nut between its teeth, and before handing it over to me he repeated a long and devout invocation. On another occasion, also, when I purchased from an old man a large fish, which he had just taken with great difficulty, he would not hand it over to me till he had cut off one of the pectoral fins, to return it, with an invocation to the *nitu*, or soul of the fish, lest he should come by harm.



INSTRUMENT FOR CRIMPING THE HAIR.

The character of the hair is the same in both sexes. Among the women hair is abundant on the head without being

profuse; but they take little or no care of it, simply twisting it into a knot behind, where it is transfixed with a neatly ornamented comb. They never dye it, that apparently being the prerogative of the male sex alone.

The men vary very greatly in stature: some are short and thick-set, and reach little over 5 feet, if they even attain that height. The greater proportion are tall, well formed men of about 5 feet 11 inches, but some stand well over 6 feet—splendid looking fellows with perfect frames and magnificent muscles. In their walk they stride forward in a jerky, bouncing style, which gives to the head and their hair when combed out behind, a quick nodding motion. Their whole motion is full of grace, but so proportioned are they that it really seems scarcely possible for them to move ungracefully. As youths they are splendid examples of the human form; as children not a few of both sexes are really pretty in face and figure, but unfortunately they are frequently disfigured by an enormously distended stomach and abdomen, which induces a sad and sickly expression of countenance. The women vary greatly also; some being short and thick-set, scarcely reaching 5 feet, while others are as tall as the taller of the men. Many of the girls are handsome, and a few are even beauties, with pensive eyes, delicate features, and faultless in contour of body and limb; but as they pass into the married state their features become coarser, yet on the whole neither sex can be called ugly.

The colour of their smooth soft skin is a rich chocolate brown; but here and there among them occurs a quite black-skinned individual, who is at once remarkable as being an exception to the prevailing colour. In feature the forehead retreats slightly from the prominent superciliary ridges, as seen in profile. *En face* it is somewhat flat. In the malar region, in some the cheek-bones are very prominent; while in others, again, this feature is as little observable. The brows are low, but not conspicuously hairy. The eyes are small and narrow, and in some of them a slight obliquity is observable, while, on the other hand, there are those with the eyeball very prominent. There are two distinct forms of nose among them: one in which that feature is very low between the eyes, advancing with a straight dorsum to the *retroussé* tip, which discloses both nostrils conspicuously,

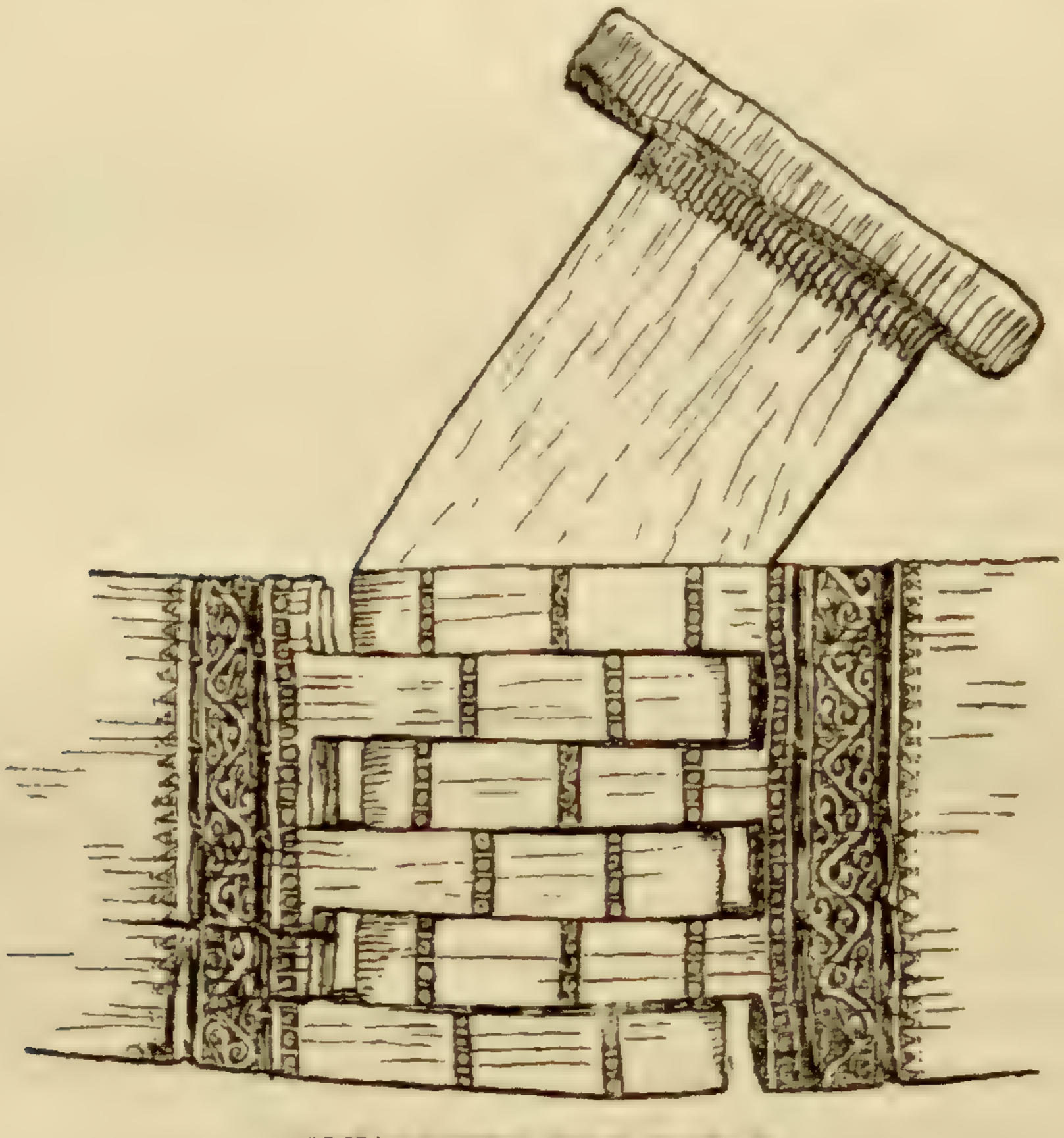
the tip being markedly pointed; the other form in which the dorsum is higher between the eyes, is straight, and sometimes arched, and the tip pointed, depressed, and incurved to form a thick fat septum. In this form the nostrils are almost concealed, and the *alæ nasi* much inflated. *En face* both dorsa are straight, the first form exhibiting the nostrils fully and the septum; the second form with the dorsum compressed slightly in the middle, the nostrils scarcely seen, and the *alæ nasi* inflated. The upper lip is prognathus; the lower somewhat retreating or orthognathus. The teeth of the upper jaw overlap those of the lower jaw, but this is not invariable, many of both sexes having the teeth meeting evenly. From the malar region the face rapidly converges to the small, non-protruding, round, and rather well-shaped chin. The ears are small, but a good deal disfigured by the large irregularly bored holes and slits made in the lobe, while the helix and scaphoid fossa are distorted by a series of smaller holes in which the earrings graduate from above downwards, from small to greater.

From my own observations on the living people, as well as from an examination kindly made for me by Dr. Garson of the crania which I brought home, two very different types can be made out, the brachycephalic and the dolichocephalic, the former greatly predominating. From the differences in colour of the skin, from the variation seen in the features and in the character of the hair it is evident that in the Teninber Islands we have a distinctly mixed race, consisting of Malayan and Polynesian elements, as well as of the Papuan as found in New Guinea; in fact, some of their crania are indistinguishable from specimens obtained near Port Moresby. The Malayan type of nose did not always coincide with the presence of straight hair, though in some cases they did so markedly. I noted women in Larat with perfectly straight hair, and yet with the Papuan type of nose and face; and others again in whom frizzly hair accompanied a nose half Papuan, half Malayan.

By Polynesian I mean the brown race seen in the Fiji and Samoan Islands, as distinguished from the sooty black tribes occurring in Aru and New Guinea. This commingling may be the result of many causes. Timor-laut was probably one of the last Islands, as Mr. Keane believes, occupied by the Polynesian race in Malaysia during its eastern migration to

the remote Archipelagos of the Pacific, and some members of the family may have been left behind, and these mingling with subsequent arrivals from Papuasia and Malaysia may have thus contributed to the present heterogeneous ethnical relations observed by me.

That some connection with the Indo-Malayan region has taken place, seems to be indicated by the presence of the Tangalunga one of the *Viverridæ*, so commonly carried about by these people, and of the herds of buffaloes on the mainland,



ORNAMENTED BELT-BUCKLE.

animals quite foreign to the Austro-Malayan region, which must have been brought by the Malays, though it is incredible that in their small praus they would carry so great a quadruped as a buffalo. The Timor-laut tribes have, moreover, been long notorious for their piratical habits, attacking all boats passing near their shores, making slaves of the men, and concubines of the women. In the boats that called at Ritabel on their way home from various parts of the group I have seen being taken back with them women, whom the chain binding them to the mast proclaimed to be slaves captured or bought. The

Buginese and Macassar traders also carry on a considerable traffic in slaves, bringing them from Halmaheira and the coasts of Borneo and Celebes. In this way also may be accounted for some of the race-mingling.

The clothing of the men consists of a narrow T-shaped loin-cloth, with the ends which hang down in front decorated with red, black and white patchwork, and adorned with sections of cowrie-shells and with beads. The women wear a short sarong (Malay petticoat), artistically woven by themselves out of the fibres of the Aloan-palm (*Borassus flabelliformis*), suspended by a broad belt made from the stem of its leaf and fastened by an elaborately carved buckle of wood which frequently in married women has been the gift of her husband at the time when her purchase-money was agreed on, possibly a sort of engagement token. Armlets cut from *conus* shells, of brass, of ivory, or of wood, carved like those worn by the Hill Dyaks of Borneo, are worn by both sexes; while the women have in addition toe-rings and anklets of brass. Round the helix and in the lobe of their ears the women wear a graduated series of silver or of gold lorlora or rings, which in the case of the men is often so heavy as to break away the cartilage. The patterns of these ear ornaments are exceedingly chaste, especially those carved out of bone, of ivory and ebony combined, or of the tooth of the rare and highly-prized dugong (*Halicore*).

EARRING.

Both sexes tatoo a few simple devices, circles, stars and pointed crosses, on the breast, on the brow, on the cheek, and on the wrists; and scar, with the utmost equanimity, their arms and shoulders with red hot stones in imitation of small-pox marks, as a charm that will ward off, they think, that disease. I did not, however, see any one variola-marked, nor could I learn of an epidemic of the disease having appeared among them. As it was considered by the women a mark of beauty to have filed teeth, some of them had only a narrow rim left protruding from their gums.

The men spend a life of savage indolence or indulgence, the women alone are always busily occupied. In the morning,

after arranging their hair, the men remove from the palm-trees, invariably to the chanting of a song of invocation, the bamboos with the *tuak* collected in them over night, and trim the stem for running during the day to supply their evening libations. Than when ascending the trees the Tenimber athlete, his fautless form against the sky, and his brown skin and golden hair in contrast with the grey stem of the tree, never shows to greater advantage.

The chief meal of the day lasts from about eight o'clock till nearly noon, and consists of boiled Indian corn meal, mixed with mashed manioc and peas, along with fish—hunted for along the shore with bow and arrow, or by scattering on the water rice steeped in an infusion of a poisonous vine—and a very great deal of palm wine, fresh drawn as well as distilled. The meal is partaken of in considerable companies together in large sheds open at the gables in or near the village, generally in the buildings where their *tuak* is being distilled, which are used also for common assembly rooms. Very few of the older men leave the meal sober, or become "capable" during the rest of the day, a condition in which they are boisterously talkative, querulous and pugnacious. The women eat in private, or snatch a bite of food when they can.

All day long two ceaseless sounds are heard, the click-clack of their looms and the dull thud of the stamping of Indian corn and peas in large tridacna shells. If the women are not thus employed they are away by prahu, accompanied by some of the younger men, to fetch the necessary stores from their gardens. In these plantations, made in the forest on the poor soil which covers the underlying coral rocks, they cultivate sweet potatoes, manioc, sugar cane, and their staple food, Indian corn, with a little rice (which grows very badly), some cotton, and a good deal of tobacco, whose leaves they chew but do *not* smoke.

In time of war the common safety is watched all night by the villagers, eight or ten at a time in rotation, who dance the Tjikelele round a figure of their deity, or *Duadilah*, each man beating with his hand on a cylindrical drum, singing to its accompaniment a song or invocation with a wild and shrieking chorus, which at the time of full moon is kept up for many unbroken days and nights.

Their arms are a shield, often elaborately carved and

adorned with the hair of their enemies, bows and arrows, and various forms of iron or copper pointed lances and spears, which they can use with marvellous precision, and a long sword carried in a loop in a buffalo-hide corslet to fit beneath the arms made by themselves, and resembling a 16th century cuirass, of which it is probably a copy. They use also counterfeit Tower guns (made in Singapore), but as they fill them with gunpowder almost to the muzzle they are nothing like the dangerous weapon—except to themselves—that their unerring arrow is.

A man may have as many wives as he can purchase, but as a rule it is all he can do to secure one, till, at least, he is considerably advanced in years, and has disposed of some of his daughters for gold earrings and elephants' tusks, two factors which cannot be eliminated from the bargain, and are not over common. These tusks are brought chiefly from Singapore and Sumatra where they cost 200 or 300 florins each, by the Buginese traders, who with the westerly winds seek out the creeks and bays of the "far, far East" to exchange them for trepang and tortoiseshell. The father of the girl has often to wait a long time for the ivory portion of her price; but he hands her over, on the payment of the other items of the bargain, to her purchaser, who takes up his abode in her house, where she and her children remain as hostages till the full price is paid. A girl sorely wounded by the Blind God occasionally takes the settlement of affairs into her own hands, and runs away with the object of her affection, without the permission of her parents, a proceeding which does not relieve him of the purchase money. If, however, she had been or was about to be disposed of to another man, and had eloped with a more desired youth, she would be forcibly seized and her companion would be punished with death. Their wives, if not treated with a great show of affection, are not subjected to much restraint or subjection, and live a free and not unhappy life.

The opening months of a Temimber's islander's existence are not passed on a bed of roses. Strolling through the village one evening we were beckoned into a hut to see a newly born infant. It was lying quite naked, with only a hard palm-spathe beneath its back and a square inch or so of cloth on its stomach,

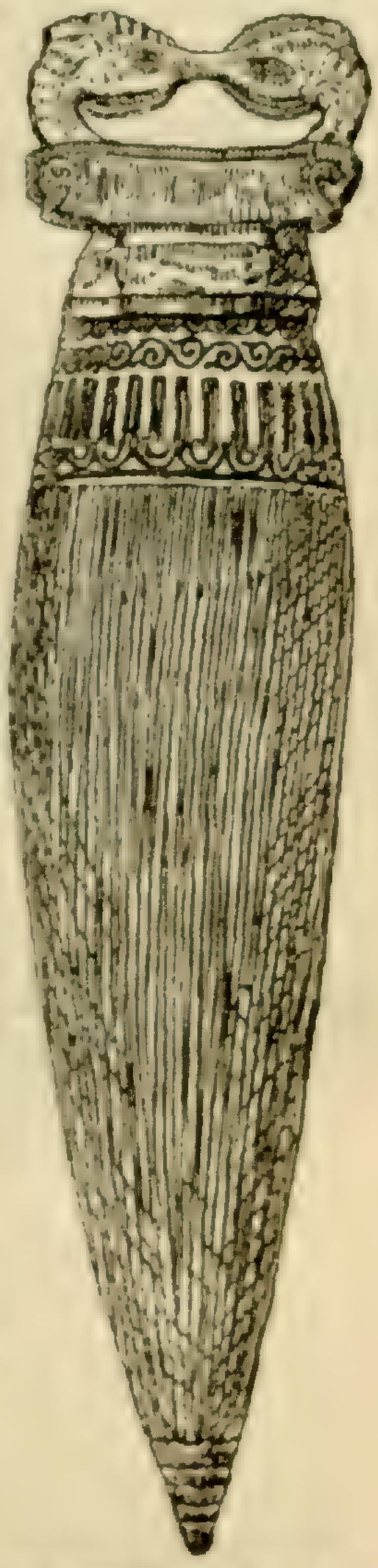
in a rude cradle or *Siwela*, a rough rattan basket suspended so as to rock over a fire in a smoke so dense that we were amazed that it was not suffocated. Occasionally the nurse drops

CARVED COMB, ORNAMENTED WITH INLAID BONE.

to sleep, and the fire burns the bottom out of the *Siwela*, and the child is worse off than if it had been bitten by all the mosquitos of Larat, to be free from which it is so suspended. The

child, it would seem, is invariably laid in exactly the same position in the cradle, either on its back or on one side according to the place of its suspension in the house, with the result that the hinder part of its head becomes quite flattened. In some living infants the deformity was very prominent, and that it remains permanent is evidenced by one of the crania of a full-grown man which I brought home; but no sort of binding is applied to the head in any stage of their youth, as among many tribes, to induce an abnormal and admired shape of head.

The artistic ability of the Timor-laut people is unquestionably very high. They are very deft-fingered and clever carvers of wood and ivory. The "figure-heads" of their outrigger praus, dug out of single trees, especially attract attention by the excellence of the workmanship, carefully and patiently executed, and the elegance of their furnishings; while the whole length of the central pillars of their houses are also most elaborately carved with intricate patterns and representations of crocodiles and other animals. Their appreciation of beauty is a characteristic of them, which, absolutely wanting in the Malay people, I was surprised to find among a less advanced race. While walking through the forest they invariably pluck and tastefully arrange in a hole in their comb which is there for the very purpose, any particularly bright bunch of flowers they see.



ORNAMENTED CHALK-HOLDER.

Their houses, though little more than floor and roof, are very neat structures, elevated four or five feet above the ground, and entered by a stair through a trap-door cut in the floor, which is shut down and slotted at night. In front of the door is a seat of honour—*dodokan*—with ornamented supports and a high carved back, on the top of which is placed an image—*Duadilah*—with, at its

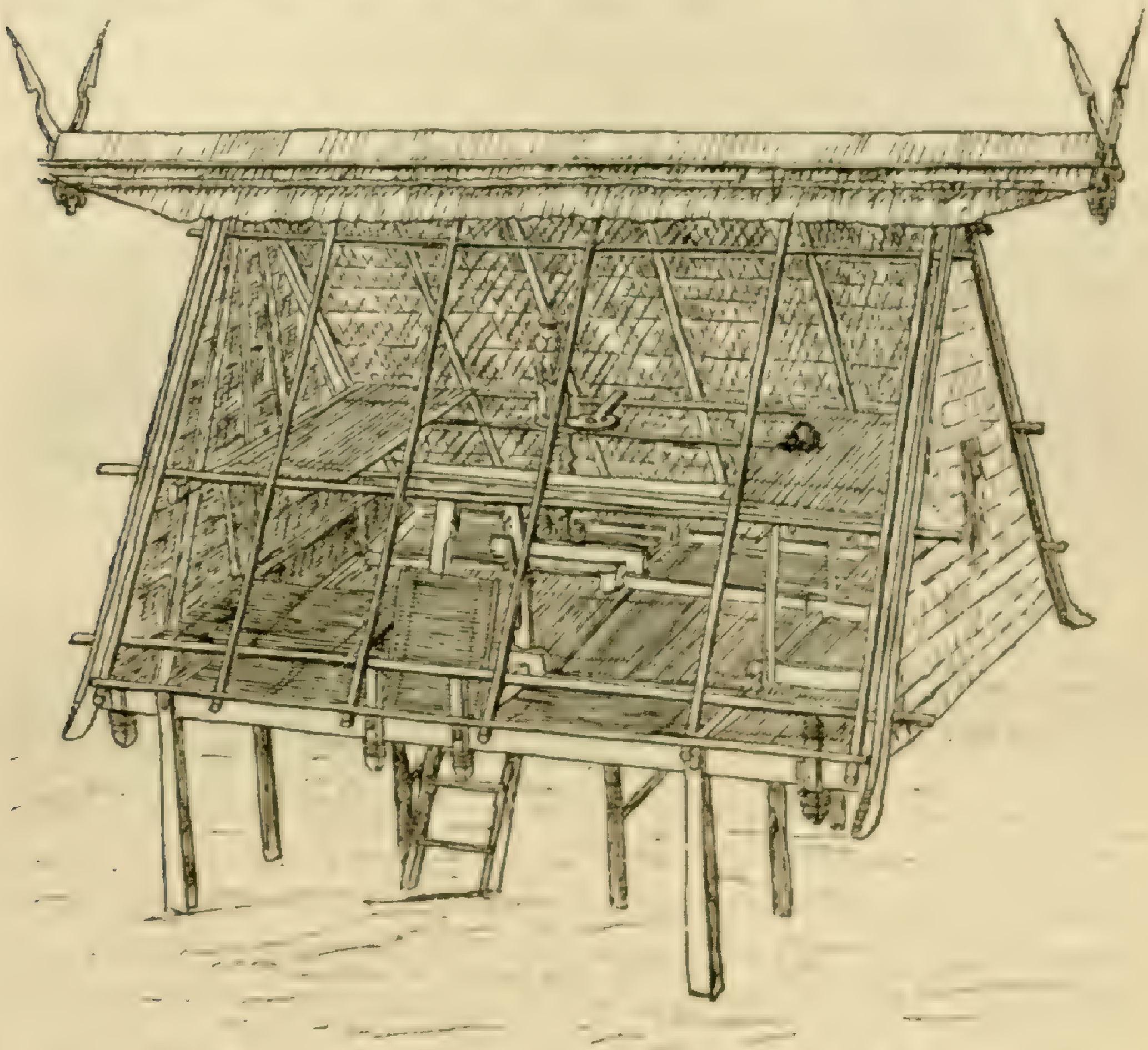
side, a platter whereon a morsel of food is offered every time they eat in its presence. Every time they drink they dip their finger and thumb in the fluid, and flick a drop or two upward with a few muttered words of invocation. Along the four sides spaces for sleeping on are raised some nine to twelve inches above the level of the *rahanralan* or floor of the house. The inmates sleep on small, neatly made bamboo mats, and rest their heads on a piece of squared bamboo with rounded edges, exactly similar to the Chinese pillow. In one

HOUSE IN TIMOR-LAUT.

gable is the *foean* or fire-place, and opposite to it on a trellis-work platform is placed the cranium of the father of the Head of the house. Indian corn and other comestibles and various articles are stored on little platforms stretching between the rafters, and their scanty clothing and other articles are suspended from the roof by wooden contrivances often elaborately designed and elegantly carved (see pp. 320, 324). After seeing how elaborately covered almost everything they used was with carvings, executed with undoubted taste and surprising skill,

we began to ask ourselves, first, Can such artistically developed people be savages?—and, next, the more difficult question, What is a *savage?*

The Tenimberese are very independent in character; "every man his own master" is their motto. Though they have an *Orang Kaya* or Chief, his voice has but little more influence than any other full-aged man's. The "old men's" opinion has some weight with the younger men, but every man speaks out

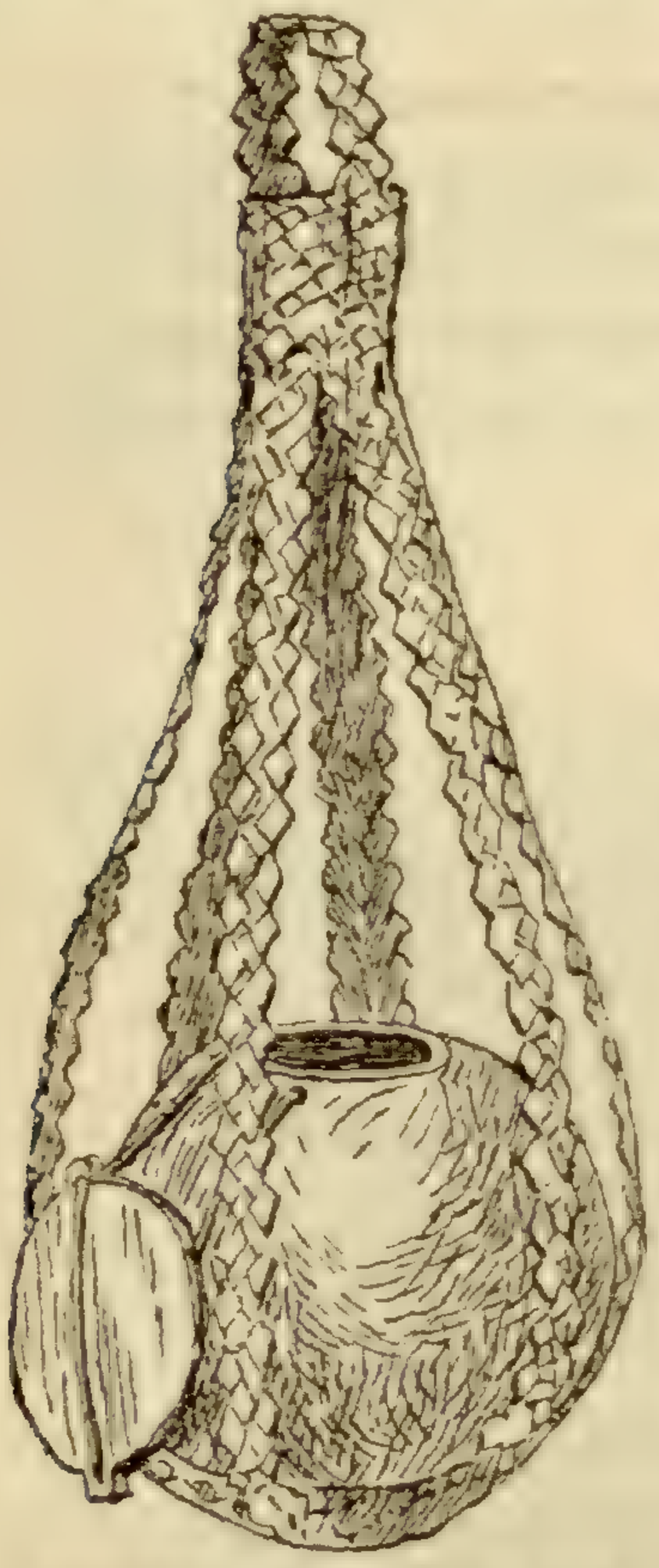


HOUSE IN TIMOR-LAUT, WITH ROOF REMOVED TO SHOW THE INTERIOR.

his mind boldly and fearlessly. When any serious deliberation is going on, the whole community crowds round the assembly room, the women even taking part, and expressing freely and without offence their opinions. The voice of the majority is the law of their community.

Their moral characteristics are such as might be expected from a rude people subject to no restraint; they are sensual, though no immorality in their actions or in their carvings ever comes to the public gaze. They are essentially selfish and

devoid of all feelings of gratitude or pity. To give anything for nothing would be a breach of all their hereditary instincts.



SUSPENSORY CONTRIVANCE MADE OF PALM-LEAF.

On one occasion, towards the end of our stay, when our larder was empty and our men were away in the northern island of Molu, a bunch of fish, which A—— was sorely in need of after a long bout of fever, was brought to us for sale; but the barter demanded was a particular kind of button, of which we had not a single example remaining. We offered almost anything they might choose from our stock—cloth, knives, beads—nothing, however, but *the* button would satisfy them. Give us the fishes the owner would not; instead, he hung them on a peg at our very door, where we dared not have touched them, where they remained till next day, when I had to fetch him to relieve us of the putrefying odour, which he did by casting them into the sea! Where they think they can escape detection they lie and steal without compunction, though their laws punish the latter with slavery, from which the thief can be ransomed only by a great sum. When sober they are good natured enough and live in harmony with each other, but in their cups they are easily offended. To their enemies they are savagely cruel, executing on those that fall into their hands the most revolting atrocities before affixing their dismembered quarters to their public places.

Like all untutored races they are very inquisitive. They watched our "manners and customs" as eagerly as we did theirs. From morning to night we had constant relays lying in or sitting about our house, whom it was impossible to dismiss without giving offence. Though it was a very interesting study and there was much to be learned from watching those big children in their various moods, it was not quite pleasant to have them always with us, or to take our food with an infinitesi-

mally clad savage sitting at the table, rubbing his hips against our plates. Happily, I observed one day that they had a mighty horror of snakes, which supplied me with an effectual means of ridding ourselves when over-burdened with their company. I would cautiously proceed to insert my hand without any apparent reference to our visitors, into the large tin in which my spirit specimens were kept, an operation they pressed closely and intently round me to watch. A vigorous splutter inside made them draw back somewhat; but on withdrawing my hand with a writhing snake, the crowd would tumble over each other out at the door screaming and shouting. As they never waited to see the end of the operation, they never came to know that I had not a mania for keeping live snakes.

In the treatment of their children, both parents were invariably kind and affectionate. To see the fathers carrying about their children in the evenings, with kindly care, one could scarcely believe in the savage ferocity of their natures, as we had seen it exhibited more than once. Like mothers everywhere else, the women seemed pleased at the notice A—— would take of their infants, who, like those with white skins, derived amusement from little dolls—stuffed with rice grains instead of sawdust; and the little packets of sugar she often gave them were inviolately kept though tempting enough to the mothers also, and given to them little by little. All their children were profusely adorned with beads and necklets, and their little limbs were encased in perfect bucklers of shell armlets.

The youths and boys used to play in the evenings in the most lively manner, often in company with the younger fathers, while a crowd of interested villagers looked on. One of their great amusements was the sailing of miniature boats elegantly made out of *gaba-gaba*, or sago palm stems, which they entered for championship in spirited regattas. They would build also forts of sand, and defend them against their comrade foes with balls of wet mud. The laughter which hailed a good hit told of the enjoyment and interest of the on-looking crowd of villagers of all ages. Their chief game, however, one more of skill and precision than the others, was played with discs cut off from the top of *conus* shells, of which each player had two One of these quoits he deposited in a little depression in the ground, and the other he played from a crease a few yards

distant, so as to dislodge a quoit from the row. If the player failed to hit he had to return to the crease to play again in his turn, but if he succeeded he played a second time from where his quoit rested. Passing his right hand holding the disc round to his left side as far as he could stretch, and steadying it with his left hand, he would take in this position steady aim, calculating with a glancing eye the spot he intended to hit, then with a run forward a few steps to the crease, he would deliver with all his might. Not only did the young lads and boys engage in this game, but even the grown-up men joined with much boisterous laughter. At a very early age the children begin to wade about the shallow margins of the sea, practising with spear and arrow the capture of fish, training arm and eye till when they have come of age, they have attained an almost unerring accuracy of aim. A fine exhibition was to be witnessed of the beauty of the human figure when the youths—fine fellows in the perfection of their manhood—came out at sundown to practise the drawing of the bow or throwing of the lance. How awkward were the attempts of myself and my Amboinese boys! How well-merited their good-natured jeering! The marvellous grace, however, of the human form was unsurpassingly exhibited when—the setting sun behind their lissom untrammelled figures—the women were returning from the fields, standing erect at the stern, and with long strokes poling in their buoyant praus. One view might shame half of the spine-deformed, waist-distorted slaves of fashion out of customs, which are as barbarous as any which are recorded as strange or hurtful among savage peoples.

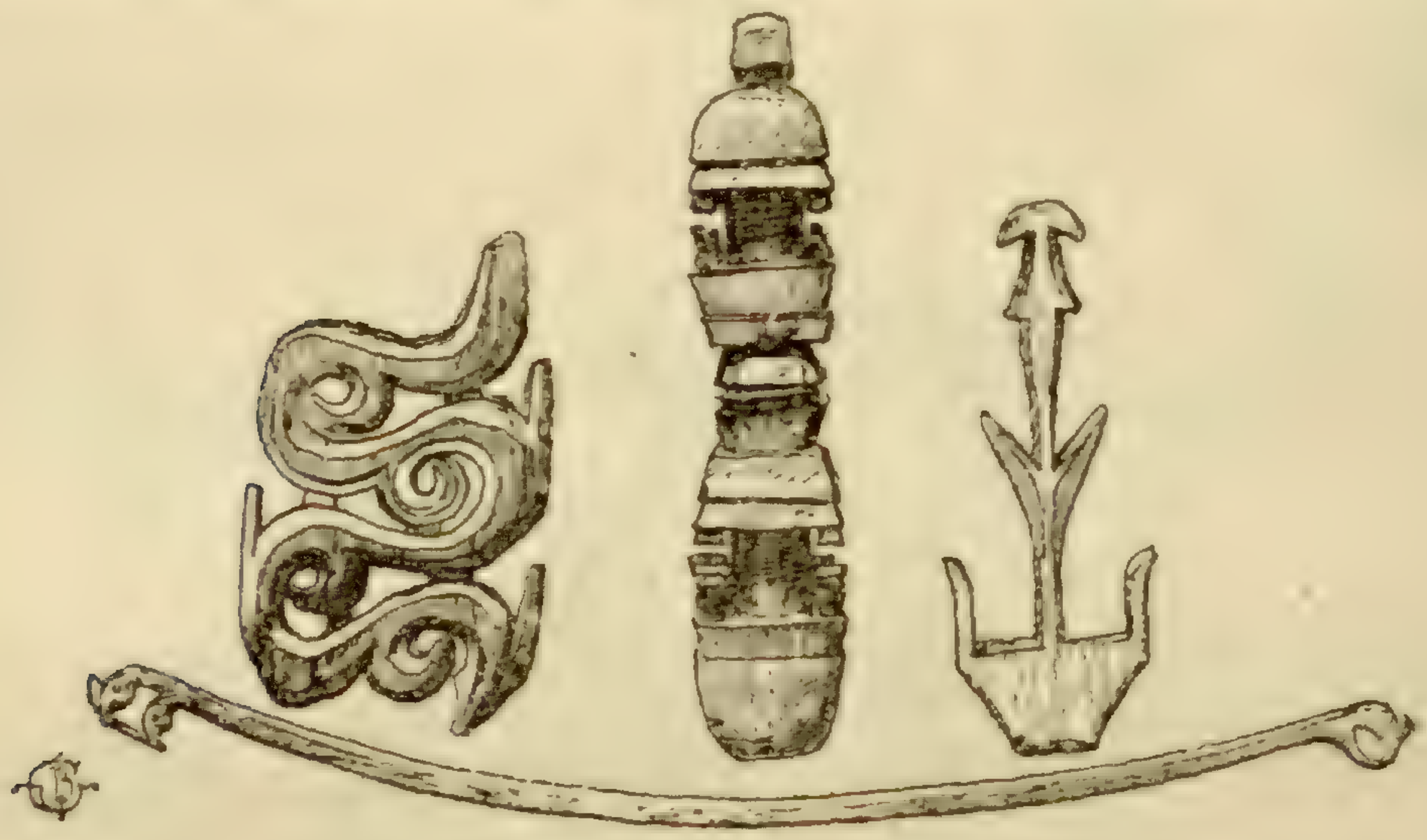
When a man dies, his children and relatives assemble to lament his departure, but I have never seen any outward expression or sign of mourning. A pig is killed, but I am in doubt whether it is given to the assembled people to eat or laid with the dead body, which is then placed in a portion of a prau fitted to the length of the individual, or within strips of *gaba-gaba*, or stems of the sago palm pinned together. If it is a person of some consequence, such as an *Orang Kaya*, an ornate and decorated prau-shaped coffin is specially made. This is then enveloped in calico, and placed either on the top of a rock by the margin of the sea at a short distance from the village, or on a high pile-platform erected on the shore about

low-tide mark. On the top of the coffin-lid are erected tall flags, and the figures of men playing gongs, shooting guns, and gesticulating wildly to frighten away evil influences from the

GRAVE OF A NATIVE CHIEF.

sleeper. Sometimes the platform is erected on the shore above high-water mark, and near it is stuck in the ground a tall bamboo full of palm-wine; and suspended over a bamboo rail

are bunches of sweet potatoes for the use of the dead man's *Nitu*. Two days after the burial, the family go to bathe and wash their hair; and after two days more they search for ten fishes and one tortoise wherewith to give a feast, which is finished with siri and libations of palm-wine. When the body is quite decomposed, his son, or one of the family, disinters the skull and deposits it on a little platform in his house, in the gable opposite the fire-place, while to ward off evil from himself he carries about with him the atlas and axis bones of its neck in his *luru*, or siri-holder. The bodies of those who die in war or by a violent death are buried, and not placed on



CARVED SUSPENSORY CONTRIVANCES.

rocks or on a platform, where only such as die naturally are deposited; and if his head has been captured a cocoa-nut is placed in the grave to represent the missing member, and to deceive and satisfy his spirit.

I am doubtful if these rites are always faithfully performed, for on walking along the shore I have often seen, where the coffin has fallen to pieces, complete crania on the rocks where the body had been deposited, while occipital and frontal bones, mingling with jaws of pigs, lay quite uncared for on the shore. The dead man's spirit, they say, goes to Nusa Nitu, or Maramatta—"an island near to Ceram," which the navigator passes fearful and vigilant, believing he hears strange unsiren sounds wafted out to him on the sea, and is thankful when the Home of the Spirits has sunk down in the horizon behind him.

Northward from Ritabel, our village, the shore of the channel was dotted with detached coral boulders, on each of which several corpses reposed, whence the most fearful stench used especially after rain, to come down the wind. Whether this, or the *Convolvulaceæ* and creeping *Papilionaceæ* that flowered in abundance there, was the attracting cause I cannot say; but certain it is that these most pestiferous spots were our richest butterfly grounds. There A—— caught the new *Hypolymnas forbesii*, *Terias laratensis*, and among many others two different species, *Calliplaea risenda* and *Chanapa sacerdos*—which it was next to impossible to distinguish on the wing from their mimicking each other—both new to science, while the lovely *Ptilopus wallacii* frequented in crowds the fig-trees that overhung this fœtid shore.

CHAPTER V.

SOJOURN IN TIMOR-LAUT—*continued.*

Religion and superstitions—Visit to Waitidal—Barter for a skull—Send my hunters to the northern islands of the group—Climate of Timor-laut—A *mauvais quart d'heure*—Designation of the group—Geographical and geological features.

The Tenimber islanders recognise some supreme existence whom they call *Duadilah*, of whom there is an image in their houses, over the principal seat, or *dodokan*, facing the entrance, with at its side a platter, or *bilaan*, on which a little food and drink is placed whenever they themselves eat. From their luvus, among the other heterogeneous odds and ends which it contains, they can generally produce one small image, sometimes more. Their little gods vary in form according to the occupation they are engaged in; but in what light they regard them I could not discover. Singularly enough, one of these images (on the left hand, p. 327) has a most wonderful resemblance to one brought by Mr. Wallace from New Guinea, and figured in his 'Malay Archipelago.' That they have a firm belief in a powerful, chiefly an avenging, spirit I feel certain. One day a stranger to the village had his loin-cloth stolen. After several days had passed without his recovering it, we were surprised to see a boat urgently propelled across the bay, from which the owner of the stolen cloth impulsively sprang, bringing with him a small red flag on the end of a slender pole. This he erected on the spot whence his cloth had disappeared, and after looking up with a steady and penetrating eye and repeating in a most tragic and excited manner a long imprecation against the thief and the village, he removed the pole, jumped into his boat, and, without accosting any one, withdrew in the same urgent manner from the now doomed village.

As the constant dread of attack by the Kaleobar tribe on our village, by keeping us in a daily state of suspense and anxiety, restricted my operations to a narrow area, I proposed to the native Postholder that we should together visit that village to

DUADILAH.

try what could be done by personal influence to establish peace. He, however, seemed by no means willing to accompany me, excusing himself on the plea that the people of Waitidal the next village, which had lost more than our own by Kaleobar raids, would oppose a peace. I therefore determined first to

sound them on the subject. Accompanied by an *Orang Kaya* or chief, from Sera, on the west coast, who happened to be in Ritabel on a visit, and who spoke a little Malay, I proceeded to Waitidal. As like most of the Tenimberese villages, it was situated on a flat space of some extent on the summit of a bluff which stood a good way back from the shore, we had in order to reach the gateway to ascend the perpendicular face of the cliff by a steep wooden trap stair, which I observed was of dark-red wood, its sides elaborately sculptured with alligators and lizards, and surmounted by a carved head on each side. On entering I saluted those near the gate, but we were rather coldly received. As we proceeded up the centre of the village two elderly men, who were evidently intoxicated, rushed at us with poised spears, gesticulating and shouting to those around to oppose us. The tumult brought out the *Orang Kaya*, whose approach prevented any immediate act of hostility, and to him my guide explained the object of our visit. Having shaken hands with us—a sign of friendship—he, accompanied by the older men, conducted us to his house, through the door-hole of which I ascended with the uneasy feeling of entering a trap. My proposals being fully explained to them, they were received at first with little opposition, till my intoxicated friends joined the circle. One was evidently a man of some importance in the village, and at once opposed the project in a spirit of hostility, which gradually spread to the others. As no palaver is ever conducted without profuse libations raw palm-spirit distilled by themselves, was passed round in cocoanut-shell cups, and I was expected to keep pace—no slow one—with their drinking. As the spirit circulated the hostile feeling developed, especially as the discussion had merged into another, viz., that I should be persuaded to leave Ritabel and dwell in Waitidal. They found I had sold much cloth and knives in Ritabel, but had brought none over to them; I could have plenty of fowls among them; they would find me no end of birds, and would not cheat me in the way the Ritabel people were doing. To this, of course, I could not agree, and put my refusal as pleasantly as I could. I tried to bring the palaver to a close by rising to leave; but this they would not permit, for one of them barred my exit by sitting on guard on the top of the hatch. I shortly

discovered that the subject of their excited wrangling was whether I should be permitted to leave at all. My guide, after whispering to me not to be alarmed and adding a remark I did not comprehend, went away, luckily leaving the door open, intending, as I imagined, to return soon; but he either joined some other drinking party and forgot to do so, or purposely left me to my own resources. Pretending to be quite pleased to prolong my visit, I presented my cup for more spirit, and as successive rounds were filled my companions became incapable of observing that I did not drain my cup till I had passed its contents through the floor, and was imperceptibly nearing the now open trap-door. I took the first opportunity of diving through the orifice, and with a bold step shaped my course for the stairway at the top of the rock, where I felt I could dispute my departure on even terms. My guide appeared with rather a hang-dog look, and we wasted no time in getting to our boat and rowing out some distance from the shore.

I did not venture a second time amongst them, although the villagers of Waitidal in order to secure a share of the cloths and other goods I was disposing of, came over constantly to our village in twos or threes, to barter provisions, carved work, and ethnological objects. On one occasion an amusing incident occurred during the purchase from a Waitidal man of a cranium. He had brought me, with the usual secrecy, a fine skull, but fitted with a lower jaw which I saw did not belong to it. I pointed out the fact, and urged him to make a search for the corresponding bone. After arguing the point a long time without effect, he thought he had settled matters by saying, "There is really no mistake; I remember quite well when my father was alive he had just this sort of under jaw!" Finding it was no good and that I would not trade, he went his way; but in a few hours he came back with a beaming face—he had found his father's lower jaw. His father's brother had been laid down on the same stone, hence the mistake. I trailed to his dutiful son's satisfaction, who, before giving me possession, inserted a piece of pinang nut between its teeth, and in a most reverential manner paid his last invocation to the Head of his line. That son's welfare is regulated now from the Mammalian Gallery of the British Museum!

The Postholder, backed by the action of the Waitidal

people, would not venture to Kaleobar, and I did not consider it prudent to go alone. We had therefore to bear with equanimity what could not be remedied; but it *was* galling to be in a new and unknown country and be tied to a few acres of it, without being able to cross the mainland to the west coast, or to penetrate farther south from want of guides, and especially of carriers to accompany me; for, contrary to the general statement that there exists a "black frizzly-headed savage people in the interior," * there are absolutely no inhabitants in the interior of Timor-laut. Villages occur pretty thickly along the coasts, except on the northern portion, where there does not appear to be any population at all.

As the Postholder was about to pay a visit to the outlying islands of Maru and Molu, which were inhabited by a very friendly people, I decided to send with him my two men—as I dared not myself leave my Herbarium to the care of a native, and my stores and collections unguarded—to collect and bring me all the information they could on the points I instructed them on, while I continued my operations on the still fruitful region to which I had access.

The climate of Timor-laut is one of extreme insalubrity. For the first eighteen to twenty days none of my company suffered in the least; but that period seemed to be with us all the limit of resistance to the deleterious miasma. The fever, the result in great part of the bad water (there being no streams in the district), and of the strong south-east winds that then supervened was one of great severity. Coming on with sickness, the temperature rose rapidly to 103°–105° accompanied with strong delirium, which in A——'s case continued for nearly three weeks with but short intervals of release. During the continuance of the fever—which happily rarely attacked us both on the same day, a circumstance that enabled us to aid each other—the two most effectual remedies were, besides quinine, salicilate of soda and chloroform, the latter especially very rapidly lowering the temperature and inducing perspiration.

Neither of us will likely ever forget our fever-attack of August 27th. A——, wretchedly weak and reduced from weeks of almost continuous fever, was assisting me to get up after a

* *Stanford's Compendium*, Australasia, by A. R. Wallace.

bad day of the same about the hour the village was going to rest for the night. A terrific shot from a native gun—always charged to the very muzzle—startled the whole community. Shouts of "Kaleobar" resounded everywhere. Like a disturbed ant's-nest the villagers, every man with his arrow on the string or a sheaf of javelins in his hand, one of them ready poised, clustered out round the barricades shouting and gesticulating. We were alone—the Postholder and our men not having returned from Molu—except for one servant, useless in such a case. After barricading the door and sliding an explosive shell into my Martini, with a cheery word to my companion who held ready a handful of cartridges, and a hasty look to see if the boat which, unknown to her, I had purchased expressly for perhaps such an emergency was still riding by its line to the pillar of the house, to serve as a last means of escape, I stood ready at the open window for what might follow. A sudden silence of the shouting supervened, a period of acute suspense to us, whose window did not look out on the barricades, and then the chief's son came to tell us that the shot was an accidental discharge of a late-returning villager's gun. It was a *mauvais quart d'heure*, short but terribly trying, which showed how tense was the nervous expectancy under which the whole village was living. The eaction of relief was nearly as difficult to endure as the suspense had been.

Besides fever, which affected the natives also, few diseases existed on the islands. With the exception of that curious fungoid skin disease so common among the Papuan races, of a little scrofula, and, among the old people, rheumatic affections of the hands and limbs, the people were very healthy.

Among other interesting facts, I learned from the inhabitants that the name of Timor-laut was quite unknown to them. This is a Malay appellation, probably given by the Macassar traders, who, falling on a large island farther in the sea than the one they best knew as the Easterly isle—which the name *Timor* signifies—designated this, by *Timor-laut* or the *Eastern Island in the Sea*. Another derivation of the name has been given that the appellation of the group is not *Timor-laut* but *Timorlao*, in which the termination *lao* means *far*, and that, therefore, their designation signifies the Far-east

Islands. I could not discover that they gave any general name to the whole group; but they invariably designated the mainland of the northern of the two larger islands by the name *Yamdena*, while they spoke of the southern portion as *Selaru*, which, in their language, is the word for Indian corn.

In examining the Tenimber islands, one is struck with the resemblance that exists between them and the Aru group, in the curious way in which both are cut up by narrow channels. "Some of the southern islands of Aru (I quote from the narrative of the voyage of the Dutch corvette *Triton* in 1828) are of considerable extent, but those to the north, lying close to the edge of the bank, are rarely more than five or six miles in circumference. The land is low, being only a few feet above the level of the sea except in spots where patches of rock rise to the height of twenty feet, but the lofty trees which cover the face of the country give it the appearance of being much more elevated."

The island of Larat is separated from the mainland by a narrow strait, which I have designated with the honoured name of the author of the 'Malay Archipelago'—Wallace Channel, which forms a fairly good harbour at its northern entrance, but shallows away towards the south end so much that only small boats can come through it at low tide, and in fact, to the south of Ritabel village the bottom can be reached all the way across, with the exception of a few yards, by a poling-rod.

Between Larat and Vordate there is, in calm weather, a safe channel, yet on Captain Stanley's authority it is quite shoal. The sea to the northward, again, is very shallow, only narrow passages separating the islands of Frienum, Maru, and Molu, as I gather from my hunters (whose information I believe to be correct) whom I sent there for a few weeks to collect, and gather information.

The lowness also of the country in our immediate neighbourhood struck me much. I could see on Larat and on the mainland, no ground rising at the most over a hundred feet or so, for standing on the shore I could look right across the main island, and see the greater part of the only height worthy of the name of mountain, within the range of vision,

the Peak of Laibobar. This mountain symmetrically conical in form, rises out of the sea on an islet on the west coast, and is, judging by the eye, somewhere about 2000 feet in height. I have little doubt that it will be found to be an extinct or dormant crater. I was shown by the natives a piece of pumice stone, used by them to polish their spearheads, which they say floats into their bay after northerly and westerly winds. Possibly some of it may be washed into the sea off the slopes of this mountain during the rainy season. Further experience showed me that the whole of the mainland of Yamdena, as far as my excursions extended, was also of coral, which formed precipitous cliffs nearly all round the islands, in some places as much as sixty to eighty feet in height; but about Egeron Strait the coast is said to rise about four hundred feet.

I was early struck with the fact that everywhere the island was composed of coral, and that the vegetation grew on the scantiest possible soil. No rock of a sedimentary or granitoid character could I detect anywhere on the islet of Larat. I had at first thought that a stratified-like mass near our residence had that character, but on closer examination it turns out to be entirely non-arenaceous.

There are no mountains in the islands, and no fresh water streams. All our so-called fresh water was skimmed off the surface of holes made in the coral, and was brackish and unpalatable. On the mainland, however, I noticed at points slightly above high-water mark fresher water than that found in Larat, flowing, it seemed, from springs.

The whole of the northern portion of the islands, therefore, appears to have been recently elevated or is perhaps still being so, after a long submersion below the sea.

The cliffs are all of coral, and the shore at low tide is formed of the stumps of elevated branched corals, and in many places a flat floor of hard concrete like what I saw in the Keeling atoll.

CHAPTER VI.

SOJOURN IN TIMOR-LAUT—*continued.*

Natural history—Flora—Disaster to Herbarium—Fauna—Mimicking birds—Insects—Fever and failure of supplies—Anxious waiting for steamer—Arrival of SS. *Amboina*—Leave Timor-laut for Amboina.

Of the natural history of Timor-laut, about which almost nothing was known before our visit, I have been able, to a considerable extent, to fill up the blanks in our knowledge.

In some places the low shrubby under-forest is so dense as to be almost impenetrable on account of its spiny character, while in other parts the woods are open below. The trees were, some of them, of considerable height, but of no great thickness, and but sparsely distributed. The largest I observed were Sterculias and fig-trees of the genus *Urostigma*. The former are common and, in throwing out their flowers in advance of their foliage, their crowns form enormous bright scarlet bosses and are the most characteristic objects in the landscape. Doubtless they occur all along the coast, and very likely suggested the term "brilliant" used by Captain Stanley in his description, already quoted, of the vegetation about Oliliet. This tree (*Sterculia fœtida*) is probably a near relative of, if it is not identical with, the Fire-tree of Australia, which has attracted so much admiration there. Leguminous trees and shrubs were very abundantly represented; and with myrtles, pandans, palms, euphorbias, *Malvaceæ*, figs, and Apocynaceous trees, formed the bulk of the vegetation. Under these a green carpet of Commelyna (*C. nudiflora*) hides the rough and knobbly coral. Casuarinas and Cycads, which, both in Timor and Aru, form so striking a feature of the vegetation, and phyllode-bearing Acacias with the Eucalyptus and Melaleuca, which characterise the Australian flora, were singularly conspicious by their absence in the districts

over which my operations extended. *Artocarpus incisa*, not the true bread-fruit, which is a seedless variety, but the species more common in the Moluccas, was found in considerable abundance. In its broad features, as far as we yet know, the plants of the Tenimber Island belong to a typically coral island flora. But among them are two most interesting species belonging to monotypic genera hitherto represented, as Sir Joseph Hooker has pointed out, only by single specimens—the one from the far separated islands of New Caledonia, and the other from West Australia. Growing in the coral crevices, often within the splash of the waves, I gathered a most lovely orchid, *Dendrobium phalœnopsis*, previously known only from Queensland in Australia, while open to the wash of the Arafura Sea outside Cape Vatusianga, the trees were covered with Polypodiaceous ferns and orchids of the species *Dendrobium antennatum*, while the whole shore was strewed with seeds of many kinds.

The Herbarium on which our present knowledge of the flora is based is very small; my own would have been much larger but for an unfortunate fire in the drying-house in which it was being prepared, which consumed the greater portion of my botanical collection—a heart-breaking episode which I give in my companion's words:—

"*September 9th.* This forenoon, when quite alone, H—— and the hunters having gone to the opposite shore for the day, and Kobes to the well a mile off, while I was sitting in that miserable, restless condition which succeeds a fever attack, a longing seized me to look out of the door, for I had for many days been unable to leave my sleeping apartment. Fortunate impulse! Kobes had piled half a dozen great logs on the fire of the drying-house (an erection like our dwelling, and all the Tenimber tenements, of bamboo and atap thatch, now, at the close of the dry season, very inflammable) and left them to the whims of a strong breeze, which, at the moment I looked, had just fanned the fire into fierce flames. I sped into the village for help, but met the Postholder with his men running towards me, attracted by the rushing noise of the flames. Without a moment's delay some of them cut great palm branches to interpose between the burning house and the overhanging eaves of our dwelling, others tore apart the framework, scattered the bundles of plants, and beat the flames with green branches,

while the Tenimber natives poured on water which they carried in gourds and bamboos from the sea close by. With what breathless anxiety I watched the effect of each gust of wind, for the thatch of our house—in which were stored several tins of petroleum and of spirits of wine, and a quantity of gunpowder—was already scorched. Had it caught, nothing could have saved the whole village, nor us from the vengeance of the people. At last the flames were got under, and I had time to realise that the few charred and sodden bundles before me was all that remained of more than 500 of the first gathered specimens of the flora of Tenimber collected at such risk and pains. I could not bear to stand on the shore, as usual, to welcome the home-coming boat, but long ere it touched, the ruined drying-house had told them the disheartening news of the disaster that had happened."

If we except birds, animal life I found to be but poorly represented. Besides a *Cuscus*, a genus of Marsupials common to the Moluccas and new Guinea, and doubtfully a wild pig, I saw no indigenous mammalian animals—with one reservation. On the mainland we found large herds of buffaloes living in a wild state, being indigenous as far as native tradition could enlighten us, for they believe that they came up out of the earth. When, and by what means they arrived is unknown; but there can be little doubt that they have been brought by the accident of shipwreck, or by design. They must feed on the *Commelyna*, and on the leaves of low shrubs, for there is no grass to be found; and they must often, I feel sure, be pressed for water to drink in the dry season.

No kangaroos were seen or heard of in any of the islands, but a small species of mouse-like mammal, of which I was unable to catch a specimen, may be a *Perameles* or jumping-mouse. Of Rodents the common rat was—too abundant. No species of *Sciuridæ* were observed. Of *Cheiroptera* there were several small species, besides a common *Pteropus* or "Flying Fox." There are no deer. One species of Sirenian, probably the *Halicore australis*, frequents the shore, and is hunted by the natives for its ivories from which they make earrings. One frog was collected, while snakes and lizards were found in considerable numbers, one of each being a species new to science. While, out of sixty species of birds, I brought no

MACHIK'S GROUND-THRUSH (*Geocichla machiki*, FORBES).

fewer than twenty forms, and of the butterflies and insects nearly one-half, that were undescribed before.

One of the objects of my visit was to determine to what zoo-geographical province Timor-laut belonged. Lying as it does at no great distance from Aru and New Guinea on the east, from Australia to the southward, and from Timor to the west, it was an interesting question which of them had behaved most bountifully by it. It is surrounded by a very deep sea, deeper, so the captain of one of the Dutch men-of-war surveying in that region just before my return to Europe informed me, than is represented in most of the charts. Looking to the birds peculiar to the group, all belong to Papuan genera (and nearly allied to known Papuan species) with the exception of a few species, which have their nearest representatives in Timor or in Australia. The insects, on the other hand, as collected by me, show a great preponderance of Timor over Aru or new Guinea forms, with a slight Australian tinge. The presence of snakes and frogs is also of great interest—a new species of the former (*Simotes forbesi* of Boulenger) being remarkable as the only one of the genus known to exist east of Java—when we consider its deep surrounding sea and all the indications that the Tenimber group, which is entirely of coral formation, has been elevated, after a long subsidence above the surface of the sea.

The most interesting discoveries among the birds were a species of ground-thrush (*Geocichla machiki*), figured on the opposite page ; and the finding in Timor-laut of a new species of Honey-eater (*Philemon timorlaoensis*), (the first bird to attract our attention after landing), mimicked by a new species of Oriole (*Oriolus decipiens*). For some time I was quite puzzled by the difference of behaviour of certain individuals in flocks of these birds on the trees. Only after the closest comparison of the dead birds in my hand was the enigma solved by my perceiving that the birds were distinct species, of widely removed families, and I learned later that I had obtained new examples of that most curious case of mimicry first detected (among birds) by Mr. Wallace, where an Oriole constantly derives protection from its foes by acquiring the dress of a bird always of the same powerful and gregarious Honey-eaters. In the Island of Buru an Oriole accompanies and

copies a *Philemon;* in Ceram and in Timor also, and now in Timor-laut yet another—the model and the copy—both of them distinct in each of the islands. When my collection was laid out for description by Dr. Sclater, the Oriole and the Honey-eater's dress were so strikingly similar, that the sharp eye of that distinguished Ornithologist was deceived, and the two birds were described by him as the same species. Besides these, another lovely new species of the same family (see Frontispiece) of the Honey-eaters, belonging to the genus *Myzomela,* which has been named after the devoted companion of my travels (*Myzomela annabellæ*) was obtained; but though it flitted about at the flowers of the cocoanut palms, and of an Apocynaceous shrub just at our door, I could not succeed in shooting a single individual, till on the mainland I at last secured the one specimen that graced my collection.

On the 20th of September the steamer was due to return; but for a week we had been anxiously counting the days, for we had been obliged, in order to eke out our supplies, to fall back on roasted heads of Indian corn, which sorely tried our teeth. We could purchase fowls on rare occasions only, as our barter articles suiting the tastes of the natives were all gone—it is a characteristic of the race, as I have said, to *give away* nothing, and to part with their possessions only for what they want at the moment, no matter if something of many times the value be offered them. Our stock of febrifuges, so often in demand, and of tea and coffee, was exhausted, and above all we were sadly reduced by the pernicious fever which was difficult to combat without luxuries we could not command. Boats from Vordate brought in the news that the threatened Kaleobar attack was really about to be made, tidings which to our villagers seemed confirmed by the simultaneous recognition of the great comet of 1882 in our northern sky. Extra guards were placed, who danced, as is their custom on such like occasions, round the village god night and day with a hideous howling chant accompanied by beating of drums which was equally incessant, and to our fever-strained nerves execrable and unbearable during the day, but perfectly maddening in the night. How we longed and looked for the steamer!

On the 28th, when our larder was absolutely empty, the

sharp eyes of the natives descried at break of day a thin line of smoke on the horizon, and before eight o'clock the *Amboina* had steamed slowly in, and, with a rattle pleasant to our ears, dropped her anchor a few yards from our door. A couple of hours later, with our precious collections safely on board, we ourselves stood watching from the deck the crowd of struggling boats heaving in the troubled water of our screw putting back to the shore, and on our swarthy and most interesting friends gazing after us from the strand, till our little home—the centre round which, for the rest of our lives, will cluster the reminiscences of most strange and utterly uncommunicable thoughts and sensations—sank down behind our horizon, happy that some of the eager hopes with which we had landed amongst them a few months before had been gratified, yet feeling how much there was left undone of what we had wished to accomplish; and as the verdure-clad shores faded from our view the recollection of our dangers and anxieties, which had been very real, vanished like an evil dream, while the intense pleasure—whose solidity only a naturalist can really appreciate—that we had derived from our wanderings amid a strange people, and a perfectly new fauna and flora, was henceforth alone to fill the retrospect of our sojourn among the Tenimber Islands.

Turning to our letters and newspapers we realised how isolated had been our situation, when we found that England had begun and fought out the Egyptian war, and that we were out in our reckoning both of the day of the week and of the day of the month.

Reversing the route we had taken in June, we arrived on the 7th of October in Amboina, where we received a most cordial welcome from Dr. and Madame Machik, now installed in a commodious and pleasantly situated house looking out on the Bay, and in which there was at my disposal delightful accommodation for rearranging and preparing my collections for despatch to Europe.

I should be very unmindful if I did not record here the more than friendly attention and care bestowed on us by both our hosts, during the many days of Tenimber fever—more violently exhibited in Amboina than in Larat—that we had to endure under their roof.

APPENDIX TO PART IV.

I. *On the* Cranial Characters *of the* Natives *of* Timor-laut. By J. G. Garson, M.D., F.Z.S.; Memb. Anthrop. Inst.; Anat. Assist. Royal College of Surgeons; Lecturer on Comparative Anatomy, Charing Cross Hospital.

In the following communication I intend to direct attention to the characters presented by a series of skulls from Timor-laut, a group of small islands situated between New Guinea and Australia, collected and brought home by Mr. H. O. Forbes. Before doing so, it will be well to recapitulate briefly the chief characters of the inhabitants of the island observed by Mr. Forbes, and described by him in a paper read last session before this institute, and published in the Journal (vol. xiii., p. 8, *et seq.*).*

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The osteological remains now to be described were obtained from the island of Larat, and consist of a series of eleven skulls and crania. Of these, nine are adult, one that of a young man of about twenty years of age, and one that of a child.

Four of the skulls appear to be those of males, and six those of women. The skull of the child is not sufficiently developed to indicate its sex. The male skulls are all of a round form—broad in proportion to the antero-posterior length, and resemble one another in general appearance. Of the females, five correspond in form to the male skulls, in being short and broad, but the sixth differs markedly from the others, in being narrow antero-posteriorly in proportion to its breadth. The form of the child's cranium resembles closely that of this last skull. The cranium of the child has been excluded from the various measurements and averages given in the subjoined table, now to be discussed, but that of the young man is included, as I was unwilling to diminish the series by rejecting it, especially as it seems to have attained its full development, except in a few respects which will be noted; though I am aware that it is contrary to custom to include any skull in which the basilar suture is not united. The male and female round skulls are separated from one another, and the latter are grouped apart from the long narrow female skull, many of the characters of which are entirely different from those of the other females.

Capacity.—The average cranial capacity of the four male skulls measured with shot according to Broca's method, is 1607 cc., or 47 cc.

* As this has been fully done in the foregoing pages, it is unnecessary to recapitulate them here; consequently, this paragraph is omitted from this reprint of Dr. Garson's valuable paper.—H. O. F.

more than that of male European skulls, the average capacity of 347 of which Topinard found to be 1560 cc. That of the round-headed females is 1,311 cc., or 64 cc. less than European female skulls, 232 of which, measured by Topinard, averaged 1,375 cc. While the capacity, therefore, of the male skulls from Timor-laut is, on an average, larger than those of European, that of the females is less than in Europeans of the same sex. The difference in capacity between males and females of Timor-laut is 296 cc.; that between Europeans is 185 cc. The individual range of capacity is considerable, one of the male skulls (No. 10) being no less than 220 cc. smaller than any of the others. The largest capacity, that of No. 4, is 1,780 cc., and the smallest 1,395 cc., that of No. 10. In the females the range is from 1,405 to 1,240 cc. The difference, then, between the largest and smallest male skulls is 385 cc., and 155 cc. between those of females. The long-headed female has a capacity of 1,400 cc.

Cephalic Index.—In the round skulls the relative proportion of the breadth to the length varies little in the two sexes; the cephalic index of the males averaging 88·1 and of the females 86·0. Reference to the table will show that the lower index of the females is chiefly caused by the almost undeformed cranium, No. 2, which has an index of only 78·9. All these skulls belong to Broca's class of true brachycephalic (skulls in which the cephalic index is over 83·33) except No. 2, which is sub-brachycephalic (between 80·01 and 83·33), on account of its width being less than, while the length is the same as that of the others. The long narrow female skull has an index of 71·1, and belongs, therefore, to Broca's true dolichocephalic group.

Height Index.—This averages about 2· higher in the male brachycephalic skulls than in the corresponding females, being 80·6 in the former, and 82·4 in the latter. The cephalic index of the males we found was higher by the same amount than that of the females. In the dolichocephalic female the right index is much lower than in the brachycephalic skulls of the same sex, a condition which the late Professor Rolleston found usually to obtain. The height of the skulls is in all instances less than the breadth, except in the female No. 2. The indices of height and breadth above given cannot be taken as strictly accurate, owing to the artificial flattening of the posterior or postero-lateral portion of most of the crania, but are as nearly accurate as circumstances will admit, and general deductions may probably be relied upon.

The height in proportion to the breadth (the latter being taken as 100) is in the males as 91·2, and in the females as 95·6 to 100.

Circumference.—The horizontal circumference of the brachycephalic skulls averages in the males 507 mm., that of the females 475 mm., while the transverse vertical circumference of the former is 456 mm., and of the latter 421·6 mm. The total longitudinal circumference averages in the males 501·2 mm., and in the females 473 mm. In each of the three circumference measurements, therefore, the female skulls are on an average about 31 mm. smaller than the males. The dolichocephalic female shows considerable differences in the various circumferences from the previous skulls of the same sex. Its horizontal and total longitudinal circumferences are each 25 mm. greater than the average of these measurements in the brachycephalic skulls, while its transverse vertical circumference is 17·6 mm. less. The increased size of the two first circumferences in this skull is due to the greater antero-posterior length of the frontal and especially the parietal bones; the other segments being almost the same in both varieties of skulls. This accords with the fact pointed out by M. Gratiolet, that in women the elongation of the cranium

depends essentially on the length of the temporal region, and is the permanent retention of a childlike character dolichocephally; being due, he has shown, to a relative development of bones which varies with age. It is essentially *occipital* in the infant, *temporal* in the child, and *frontal* in the adult man.

The form of the *foramen magnum* varies considerably, being in some elongated antero-posteriorly, in others almost circular.

Gnathic Index.—On an average the male skulls are mesognathous (having an index between 98 and 103); the brachycephalic females belong to the same group. Considerable variety is exhibited individually by the male skulls, one being prognathous and another orthognathous; the same variability is not exhibited by the females, all of them being mesognathous. The dolichocephalic female is prognathous.

Malar Height.—The development of the malar bones is usually somewhat greater in the brachycephalic skulls than in Europeans, but considerable individual variety is observable which confirms the observations of Mr. Forbes on living natives. The malars are small in the dolichocephalic female. The depression on the malar process of the maxilla or maxillo-malar notch, observed by Professor Flower to be present in the Fijians, may here be seen in the skulls where the malars are most strongly developed.

The Orbits.—The form of the orbits varies considerably, some being wider in proportion to the height than others; but the averages show both sexes to be mesoseme (index from 85 to 89).

The *Nasal Index.*—The form of the nasal aperture presents a certain degree of variation, the index varying from 48·1 to 55·8 in the brachycephalic males, and in the females of that class from 49 to 60·5, the averages of the former being 52 and of the latter 55·3. The average index of the males places them at the platyrhine end of the mesorhine group (between 48 and 53), while the females are just within the platyrhine class (above 53). Two males and three females are mesorhine, and two males and two females are platyrhine. The dolichocephalic skull is mesorhine.

The *Facial angle* formed by the meeting of the alveolar point of the ophryo-alveolar face-line and the auriculo-alveolar base line averages 70° in the males, and nearly 68° in the females. As differences of opinion may exist as to the value of the angle taken in this way I have added the nasi-alveolar length as well as the basi-nasal and basi-alveolar measurements. With these three measurements the relation of the alveolar point to the cranio-facial axis of Huxley, or basi-nasal line upon which the angle of gnathism depends, can easily be calculated, and the facial angle thus formed aptly compared with the gnathic index. A further reason for the nasi-alveolar length finding a place in the table is that some anatomists, without good reason, consider it to be preferable to the ophryo-alveolar length as the measurement of facial height, owing to its being more definite than the latter.

Regional characters of the cranial portion.—The glabella is feebly developed in both sexes, being represented by Nos. 0·1 of Broca's descriptive outlines, except in one of the females in whom it equals No. 2. The superciliary ridges are likewise feebly marked, the rebeing usually only a slight boss projecting obliquely upwards and outwards from the glabella, but not extending any distance over the orbits. The forehead recedes slightly, but the degree of recession varies somewhat, being more marked in two brachycephalic females than in any of the others; while in the dolichocephalic females it is the most perpendicular. *Tubera* are well marked on the parietal bones of the young male skull, and are associated with a narrow base, as is seen by the bi-auricular breadth

being less than that of any of the other males. These conditions are usually concomitant, as was shown by Professor Wiesbach, and are indications of a skull not having attained its full development, as in this case, or of the permanent retention of a child-like character when occurring in the fully adult skull, as is not uncommon in women. Epiteric bones are present in three of the female crania, Nos. 1, 7. and 9. In the male skull No. 10 the squamosals articulate with the frontal, the alæ sphenoid not intervening between them, as is usually the case. The zygomatic arches can be seen in most instances projecting beyond the outline of the cranium in the fronto-parietal region—that is to say, the skulls are usually phænozygous, though more so in some cases than in others. In order to estimate the amount of zygomatic projection, or the relation of the maximum cranio-facial breadth to the fronto-parietal breadth at the stephanion, Topinard has suggested the formation of an index from the bi-zygomatic and bi-stephanic breadths, in place of the angle of Quatrefages, which can only be measured by means of a complicated goniometer. Taking the former breadth as 100, I find that the bizygostephanic index of the brachycephalic male skulls averages 87·6, and of the female 87·4, and of the dolichocephalic female 94·2.

In order to compare these averages with those of other races, I have worked this out in the series of Andamanese skulls and of Fijians published by Professor Flower in the volumes of the "Journal of the Anthropological Institute" for 1879 and 1880, and the following are the results obtained:—

Bi-zygostephanic Index.

Andamanese	..	12 males,	88·3;	12 females,	91·5.
Timor-laut	..	3 „	87·6;	5 „	87·4.
Fijian ..	..	6 „	80·4;	5 „	85·5.

Before its value can be rightly estimated it will require to be worked out in a much more extended series. It may be stated, however, that crania with a bi-zygostephanic index of under 90 are phænozygus. The development of the inion is usually represented by Broca's descriptive figures 1 or 2. Though not very prominent the inion and the inner or mesial extremities of the superior curved lines are well developed and rugged, a condition to which, Professor Thane kindly reminded me, Professor Ecker has attributed considerable importance as being indicative of a simian character, these ridges being the representative in man of the crests so well marked in the skull of the orang-outan and other anthropomorphous apes. The sutures are, as a rule, simple, varying in the series from 1 to 3 of Broca's numbers, both in regard to complexity and degree of obliteration. In the dolichocephalic female the frontal suture is metopic (see p. 345), but in none of the other skulls does this condition obtain. The wormian bones are small in most instances. All the brachycephalic skulls of both sexes exhibit more or less flattening in the occipital or parieto-occipital region, such as would be produced by laying an infant, without any soft material under the head, in a cradle, like that exhibited here by Mr. Forbes from Timor-laut. The dolichocephalic female and child's skulls show no sign of flattening. The basilar suture is entirely obliterated in all instances except in the youth; no abnormality is to be observed in any case in the under surface of the cranium.

Regional characters of facial portion.—In most instances the face has a flat appearance. The axes of the orbits are in some instances more horizontal than in others. The inter-orbital portion, though not showing great variation in actual width, differs in form on account of the projection of the nasal bones being greater, and the ascending process of the

maxillaries being flatter, in some instances than in others. It occurred to me that this variation might be expressed by measuring the angle formed by the nasal bones and ascending processes of the maxillaries at the level immediately below that of the *dacryon*. This measurement, which I propose to call the *nasi-maxillary angle*, is different in its object from that of M. de Mérejkowsky, which ascertains only the *projection* of the nasal bones or maxillary processes.

The outline of nose is represented by Broca's descriptive numbers 1 and 3. The first of these indicates a nose with a low bridge turned upwards at the tip; the latter a straight nose with a higher bridge than the other. We have therefore identified on the skulls the two forms of nose observed by Mr. Forbes in the living subject. As a rule the straight nose is elevated at the root, and the naso-maxillary angle is higher than in the hooked nose, which is flat at the root. The *nasi-malar* angle is high in

NORMÆ FRONTALIS ET LATERALIS OF THE MALE BRACHYCEPHALIC SKULL, NO. 4.
(WITH THE PERMISSION OF THE COUNCIL OF THE ANTHROPOLOGICAL INSTITUTE.)

all instances. The lower margin of the nasal aperture is usually well defined, but slopes slightly in some instances into the alveolar portions of the maxillæ. The nasal spine is feebly developed, being represented by Nos. 1 and 2 of Broca. The alveolar portion of the maxillæ has become so atrophied after loss of the teeth in three skulls (one male and two females) as to be reduced to almost a narrow rim of bone; in these the alveolar height has not been measured. A correspondingly atrophied condition likewise obtains in the alveolar border of the respective mandibles. In the others in which the teeth were complete at the time of death this portion of the face is short; the measurements, however, indicate a greater estimate of the vertical distance between the floor of the nose and the alveolar plane, as in most instances there is a considerable degree of alveolar prognathism. The maxillæ are broad in comparison to their length, especially in the case of the male No. 10, where the maxillary or

palatal index is no less than 140·7. The palate is therefore markedly of the parabolic form. In this skull it is also very high. The maxillæ are narrowest in the dolichocephalic female. In all cases the posterior edge of the vomer slopes considerably forwards as well as downwards.

The characters of the mandible can be only imperfectly studied, it being lost in some instances and much atrophied in others. The chief character seems to be the absence of prominence of the chin: the symphesial angle is consequently high, approaching a right angle.

Dentition is normal in all the skulls except the male No. 4, in which the last upper molars, or wisdom teeth, are absent from non-development. The skull is known, however, to Mr. Forbes to have belonged to a man beyond middle age. The last molars have not been fully acquired in the skull of the youth No. 11. In size the teeth are large but not abnormally so, and are stained black in two of the male skulls, Nos. 4 and 10, and in the female skulls Nos. 7 and 1. In the male No. 10, the upper incisors and

NORMÆ FRONTALIS ET LATERALIS OF THE FEMALE DOLICHOCEPHALIC SKULL, NO 1.
(WITH THE PERMISSION OF THE COUNCIL OF THE ANTHROPOLOGICAL INSTITUTE.)

canines have been filed away on the anterior surface, and stained black, making them more spade-like. This custom of deforming the teeth, and staining them, is practised very commonly in Java and Birma, and elsewhere. The incisors and canines being absent in the other male skulls, it is impossible to say whether these teeth were deformed in them also. In the females there is a trace of a similar deformation in No. 2, but the filed teeth are not stained artificially. Grinding down the anterior upper and lower teeth horizontally, and staining them, seems to have been practised in Nos. 1 and 9. In the other skulls the teeth have been lost.

Relation of the inhabitants of Timor-laut to those of adjacent countries.—That the skulls just described are not those of a pure race is very evident. Two very distinct types can be made out, namely, the brachycephalic and the dolichocephalic, the former greatly predominating in number. Both from the information Mr. Forbes has given us as to their appearance, and from the skulls themselves, there is no difficulty in recognising a strong

Malay element in the population. The male skull, No. 4, and the female, No. 6, are typically Malayan in their characters, especially in possessing large open rounded orbits and smooth forehead, the supercilliary ridges and glabella being almost entirely absent. The other brachycephalic skulls, though not presenting such a striking affinity, agree more or less with the type, but give evidence of mixed characters. The dolichocephalic skull is, on the other hand, markedly of the Papuan type, and corresponds so closely as to be undistinguishable from two crania obtained twenty miles inland from Port Moresby, New Guinea, in the College of Surgeons' Museum, also from another from the Solomon Islands. Along with this form of skell Mr. Forbes informs me is associated frizzly hair and dark skin.

The examination of the cranial characters of the inhabitants of Timorlaut as illustrated by the skulls before us shows that the peopling of this island forms no exception to what is usually found in the various groups of islands in the Polynesian Archipelago. From its close proximity to New Guinea, perhaps more of the Papuan element might have been expected.

The relative proportions of the two races in any particular place seem to vary considerably, however, and till more is known of the history of this part of the world, the distribution of its inhabitants will not be understood. Valuable contributions to our knowledge of this vexed question have been made by the writings of M. Quatrefages, Professors Flower and Keane, Mr. Staniland Wake, and others. Series of skulls and skeletons like the present from different districts, with accounts of the inhabitants, are always valuable additions, and assist materially to unravel the ethnology of this interesting part of the globe.

CRANIAL MEASUREMENTS.*

	Sex.	Capacity.	Length.	Breadth.	Height.	Minimum Frontal Breadth.	Maximum Bi-stephanic Breadth.	Bi-asteric Breadth.	Bi auricular Breadth.	Cephalic Index.	Height Index.	Transverse Vertical Circumference.
No. 4 ..	♂	1780	174	157	143	104	130	116	128	90·2	82·2	478
„ 5 ..	♂	1615	170	151	145	102	127	105	134	88·8	85·3	475
„ 10 ..	♂	1395	165	147	131	96	120	104	129	89·1	79·4	433
„ 11 ..	♂	1625	179	151	135	99	*119	103	*117	84·4	75·5	440
Average of	♂	1607	172	151·5	138·5	100·2	124	107	127	88·1	80·6	456·5
No. 2 ..	♀	1305	166	131	134	88	108	100	120	78·9	80·7	419
„ 3 ..	♀	1355	165	143	129	95	114	107	119	86·7	78·2	425
„ 6 ..	♀	1405	162	142	137	90	114	108	128	87·7	84·6	433
„ 7 ..	♀	1240	160	141	133	92	115	108	125	88·1	83·1	428
„ 9 ..	♀	1250	156	139	133	88	113	109	119	89·1	85·3	418
Average of	♀	1311	161·8	139·2	133·2	90 6	112·8	106·4	122·2	86	82·4	424·6
No. 1 ..	♀	1400	180	128	125	95	115	99	112	71·1	69·4	407

* An asterisk (*) is placed against those measurements in the young male skull, No. 11, which have evidently not attained their full dimensions, owing to immaturity. A small c placed before a measurement means *circum*, implying that the measurement could not be taken exactly.

CRANIAL MEASUREMENTS—*continued.*

	Horizontal Circumference.			Transverse Arcs.				Median Arcs.				Foramen Magnum Length.
	Total Circumference.	Pre-auricular.	Post-auricular.	Frontal.	Bregmatic.	Parietal.	Occipital.	Frontal.	Parietal.	Occipital.	Total.	
No. 4 ..	521	255	236	286	345	355	245	133	128	119	380	36
„ 5 ..	510	250	260	285	332	330	240	130	132	110	372	38
„ 10 ..	493	230	263	275	298	320	237	114	123	108	345	35
„ 11 ..	504	232	271	270	317	320	260	134	127	111	372	34
Average ..	507	211·8	265	279	323	331·2	245·5	127·7	127·5	112	377·2	35·7
No. 2 ..	473	226	247	261	293	330	245	123	125	100	318	32
„ 3 ..	486	225	261	258	301	326	265	119	130	107	356	28
„ 6 ..	475	328	247	250	300	325	255	121	123	105	349	38
„ 7 ..	478	233	245	262	298	310	227	119	116	97	332	39
„ 9 ..	463	215	247	245	293	316	235	122	115	103	340	35
Average ..	475	225·4	249·2	255·2	297	321·4	245·4	120·8	121·8	102·2	345	34·4
No. 1 ..	500	245	255	265	290	300	250	130	140	101	371	34

CRANIAL MEASUREMENTS—*continued.* FACIAL MEASUREMENTS.

	Foramen Magnum Breadth.	Basi-Nasal Length.	Total Longitudinal Circumference.	Basi-Alveolar Length.	Gnathic Index.	Naso-Alveolar Length.	Bi-zygomatic Width.	Bi-jugal Width.	Inter-orbital Width.	Height of Face.	Facial Index.	Malar Height.
No. 4 ..	33	102	518	106	103·9	74	137	120	24	102	74·5	29
„ 5 ...	30	97	507	..	..	..	144	120	22	·100	69·5	26
„ 10 ..	32	93	478	95	96·9	71	140	125	25	105	75	30
„ 11 ..	27	96	502	95	99	*59	*122	*110	23	·94	77	23
Average ..	30·5	98·2	501·2	98·6	99·9	..	..	..	23·5	100·2	74	27
No. 2 ..	28	98	478	100	102	62	134	113	21	92	68·7	26
„ 3 ..	28	88	472	..	..	..	124	110	18	..	..	23
„ 6 ..	29	97	484	98	101	65	133	113	20	93	69·9	23
„ 7 ..	29	96	467	..	..	..	132	115	18	..	..	21
„ 9 ...	30	89	464	91	102 2	63	123	108	20	94	76·4	22
Average ..	29	93·6	473	96·3	101·7	63·3	129·2	112	19·4	93	71·7	23
No. 1 ..	27	93	498	98	105·4	66	122	113	24	94	77	21

FACIAL MEASUREMENTS—*continued.*

	Alveolar Height.	Auriculo-orbital Width.	Orbit.			Nose			Maxillæ.			Facial Angle.
			Width.	Height.	Index.	Height.	Width.	Index.	Length.	Width.	Index.	
No. 4 ..	22	71	40	36	90	54	26	48·1	57	67	117·5	70°
„ 5 ..	..	68	45	36	80	51	27	52·9	..	..	..	..
„ 10 ..	20	70	42	34	81	52	23	55·8	54	76	140·7	68°
„ 11 ..	16	67	38	34	89·5	*43	23	53 5	52	64	123	72°
Average ..	19·3	69	41·2	35	85·1	50	26·2	52	54·3	69	127	70°
No. 2 ..	17	68	38	31	86·8	45	27	60	56	63	117·8	71°
„ 3 ..	..	62	42	33	73·8	43	26	60·5	..	..	..	..
„ 6 ..	15	66	39	35	89·7	50	26	52·9	53	68	128·3	67°
„ 7 ..	..	62	39	31	84·6	51	25	49	..	..	..	..
„ 9 ..	15	65	35	33	88·6	49	24	49	52	64	123	64
Average ..	15·7	64·6	38·6	32·6	84·7	47·6	25·6	55·3	53·7	66	123	67·3°
No. 1 ..	19	68	35	31	88·6	50	25	50	58	64	110·2	68

FACIAL MEASUREMENTS—*continued.*

	Angles.			Bi-zygo-stephanic index.	Mandible.							
											Ramus.	
	Nasi-Malar.	Nasi-Maxilliary.	Basilar.		Bi-condylar Width.	Bi-goniac Width.	Sym-phesial Height.	Molar Height.	Coronoid Height.	Gonio-symphesial Width.	Height.	Antero-posterior Width.
No. 4	147°	90°	18°	94·9	126	103	37	27	69	91	61	40
„ 5	146°	105°	23°	82·2	125	95	..	..	59	87	58	30
„ 10	13.°	116°	..	85·7	131	102	27	28	63	89	62	32
„ 11	133°	117°	..	97·5	*114	*93	28	*24	*53	*79	*48	30
Average	141·2	112·9	..	87·6	..	..	..	..	..	..	..	33
No. 2	138	95°	28°	..	..	..	..	..	..	..	..	..
„ 3	146	116°	18°	91·9	118	94	..	..	60	88	60	31
„ 6	142	91°	26°	..	..	..	..	..	..	..	..	..
„ 7	146	115°	31°	87·1	125	..	..	..	..	..	55	27
„ 9	151	110°	27°	..	..	..	..	..	..	..	..	..
Average	144·6°	105·4°	26°	..	..	..	..	..	..	..	..	..
No. 1	141°	119°	17°	94·2	112	86	34	23	54	88	58	35

FACIAL MEASUREMENTS—*contd.* DESCRIPTIVE NUMBERS.

	Angle of Mandible.		Development of Glabella.	Curve of Nasal Bones.	Development of Nasal Spine.	Development of Inion.	Wear of Teeth.	Size of Wormian Bones.
	Mandibular.	Symphesial.						
No. 4	115°	88°	1	3	1	2	1	1
„ 5	120°	..	1	1	2	2	..	3
„ 10	110°	83°	1	3	3	2	1	2
„ 11	125°	81°	1	3	2	0	0	4
Average ..	117·5°	81°	1	..	..	...	...	..
No. 2	..	..	1	3	2	2	2	4
„ 3	115	..	1	1	1	1	..	..
„ 6	..	..	0	3	2	0	1	2
„ 7	..	..	2	1	1	1	..	..
„ 9	..	...	1	3	1	1	3	3
Average ..	..	..	..	..	..	..	..	..
No. 1	117°	92°	0	3	2	0	3	1

Notes on the Table of Measurements.

All the measurements given in the preceding table correspond to those recommended by Broca in the "Instructions Craniologiques" (Paris, 1875), except the following, some of which are not given in that work:—

The transverse arcs.—These are measured with the tape from the point on the ridge at the posterior root of the zygoma immediately above the middle of the external auditory meatus, where the ridge is crossed by the auriculo-bregmatic line (the *courbe sus-auriculare* of Broca) over the respective parts of the cranium, to the corresponding point on the opposite temporal bone.

Naso-alveolar length.—From the nasion to the alveolar point.

Palatine region.—The maxillary length is measured from the alveolar point to the middle of a line drawn across the hinder borders of the maxillary tuberosities. This is easily done by stretching a piece of fine wire across the back of the mouth, the wire resting on each side in the groove between the pterygoid and the tuberosity. The width is taken between the outer borders of the alveolar arch immediately above the middle of the second molar tooth.

Facial angle.—The angle formed by the meeting of the auriculo-alveolar base line with the ophryo-alveolar face line at the alveolar point measured with Broca's median goniometer.

Nasi-malar angle.—The angle formed by the nasal bones and the external margins of the orbits at a point a little below the fronto-malar articulation.

Nasi-maxillary angle.—Explained in the text, page 344.

Basilar angle.—This is the angle N B Y of the "Instructions," p. 92, or the naso-basio-opisthial angle.

Bi-zygostephanic Index.—Defined in the text, page 343.

Conoroid height.—From the gonion to the top of the coronoid process.

Gonio-symphesial height measured with the calipers.

The size of the glabella, nasal bones, and spine, inion, wormian bones, and wear of teeth, are indicated by Broca's descriptive numbers given in the "Instructions."

Explanation of Plate (pp. 344, 345).

All the figures represent the skulls with the alveolo-condylar plane horizontal.

The photozincographs were reduced from drawings by Mr J. G. Goodchild, the outlines of the skulls from which they are taken having been previously geometrically projected by means of Broca's stereograph by myself.

This paper is reproduced from the 'Journal of the Anthropological Institute' for May, 1884. (H.O.F.)

II.—LIST OF PLANTS FROM TIMOR-LAUT.

Compiled from the Author's Herbarium, as determined at the Royal Gardens, Kew, along with a small Collection made by Native Collectors employed by Resident Riedel.

Clematis sp.
Anamirta Cocculus, W. & A.
Ochrocarpus ovalifolius, T. And.?
Sida humilis W. var. repens.
rhombifolia, L.
Abutilon indicum, Don.
graveolens, W. & A.
Hibiscus surattensis, L.
tetraphyllus, Roxb.
Gossypium barbadense, L.
Thespesia populnea, Corr.
Sterculia fœtida, L.
Melochia odorata, Forst.
velutina, Bedd. var. glabrata.
pubescens, Bl.
Corchorus trilocularis, L.
Murraya exotica, L. var.
Glycosmis pentaphylla, Corr.
sapindoides, Lindl.
Tristellateia australasica, A. R.
Owenia (may be O. cerasifera, F. M.).
Calophyllum Inophyllum, L.
Dodonæa viscosa, L.
Vitis coriacea, Miq.
Strombosia sp.
Erioglossum edule, Bl.
Flemingia strobilifera, R. Br.
Desmodium umbellatum, DC.
Pongamia glabra, Vent.
Phaseolus spp.
Mucuna (Stizolobium) sp.
Canavalia obtusifolia, DC.
Vigna lutea, A. Gr.
Dolichos Lablab, L.
Cajanus indicus, Spr.
Indigofera unifoliata.
Dichrostachys nutans?
Cynometra ramiflora, L.
bijuga, Sp.
Cassia javanica, L.
alata, L.
Cæsalpinia pulcherrima, Sw.
Nuga, Ait.
Bauhinia Blancoi, Benth.
Pemphis acidula, Forst.
Bruguiera caryophylloides, Bl.
Lumnitzera coccinea, W. & A.
Peltophorum ferrugineum, Btb
Eugenia javanica, Lam.
aff. javanicæ.
Luffa cylindrica, Roem.
Momordica Charantia, L.
Zehneria aff. mucronatæ.
Delarbrea sp.
Sesuvium Portulacastrum, L.
Carapa moluccensis, L.
Portulaca oleracea, L.
Bryophyllum calycinum, Salisb.
Randia spp.
Ixora sp.
aff. I. timorensis, Dene.
Psychotria sp.
Morinda citrifolia, L.
Carium Roxburghianum, Benth.
Vernonia cinerea, Less.
Blumea membranacea, DC.
Wedelia biflora, DC.
Bidens bipinnata, L.
Diospyros maritima, Bl.
Maësa sp.
Jasminum lancifolium, Dene.
Dischidia sp.
Marsdenia sp.
Gymnema *vel* Sarcolobus sp.
Mitreola oldenlandioides, Wall.
Alstonia spectabilis, Br.
Tabernæmontana parviflora, Poir.
orientalis, R. Br.
Cordia subcordata, Lam.
Ipomœa Turpethum, L.
cymosa, R. & Schult.
Hewittia bicolor, W. & A.
Convolvulus parviflorus, Vahl.
Tournefortia sarmentosa, Lam.
Solanum verbascifolium, L.
Lycopersicum esculentum, Mill.
Physalis minima, L.
Datura alba, Nees.
Capsicum frutescens, L.
Buchnera angusta.
Leucas decemdentata, Sm.
Coleus scutellarioides, Benth.
Ocimum canum, L.
Hyptis spicigera, Lam.
Premna obtusifolia, R. Br.
Vitex trifolia, L.
aff. V. Negundo, L.
Clerodendron longiflorum, Dene. *vel* sp. aff.
Barleria Prionotis, L.
Dilivaria ilicifolia, Jacq.
Asystasia (an) chelonoides, Nees.
Hypoëstes floribunda, R. Br. var.
Eranthemum sp. (? variabile.)
Deeringia celosioides, R. Br.

Ærua scandens, Wall., *vel* velutina, Miq.
sanguinolenta, Bl.
Amarantus caudatus, L.
Salsola Tragus, L.
Myristica insipida, R. Br.
Aristolochia sp.
Piper sp. aff. P. canino, Dietr.
Loranthus (Dendrophthoe) sp. aff. L. rigido, Wall.
Manihot utilissima, Pohl.
Acalypha indica, L.
Phyllanthus diversifolius, Müll. Arg. *vel* sp. aff.
Excæcaria Agallocha, Müll. Arg.
Mallotus albus, Müll. Arg.
repandus, Müll. Arg.
Trewia sp.
Spondia timorensis, Dene.
Fatua pilosa, Gaud.
lanceolata, Dene.
Pipturus velutinus, Wedl.
Fleurya interrupta, Gaud.
Pouzolzia pentandra, Benn.
Urostigma sp.
Ficus sp. aff. acanthophyllæ, Miq.
Balanophora sp.
Dendrobium antennatum, Lindl.
Phalænopsis, Fitzg.
Dioscorea spp.
Cordyline terminalis, Kth.
Commelina nudiflora, L.
Cocos nucifera, L.
Borassus flabelliformis, L
Metroxylon læve, Mart.
Pandanus sp.
Aroideæ spp.
Cyperus pennatus, Lam.
Setaria italica, Beauv.
Sorghum vulgare, Pers.
Polypodium trioides, Lam.
Pteris tripartita, Lam.
Asplenium gaicatum, Lam.
Vittaria elongata, Sw.
Lycopodium carinatum, Des.
Phlegmaria, L.

III.—LIST OF THE BIRDS OF TIMOR-LAUT.*

In order to give as correct a list as possible of the Avifauna of the Tenimber Islands, I have reproduced the original descriptions of my collections given by Dr. Sclater, in the 'Proceedings' of the Zoological Society, (1883, pp. 48, 194). I have also included the species recently described by Dr. Meyer, from specimens obtained by Mr. Reidel's hunters, in the paper read by him at the Ornithological Congress in Vienna in 1884, entitled, "Neue und unbenügend bekennte Vögel Nester und Eier aus dem Ostindischen Archipel im Königl. Zool. Mus. zu Dresden." Some of these species were also met with by myself, but I have in many cases not been able to recognise their distinctness from other previously described forms. As many of these differences of opinion have been the subject of discussion between Dr. Meyer and myself, I have thought it as well to reproduce my published remarks in the present appendix.

I. Accipitres.

1. Astur albiventris, Salvad.
Urospizias albiventris, Salv., Meyer, loc. cit.
2. Haliætus leucogaster, Gm.
Cuncuma leucogaster, Gm., Meyer, loc. cit.
3. Haliastur girrenera, V.
4. Baza subcristata, Gould.
5. Pandion leucocephalus, Gould.
6. Cerchneis moluccensis, H. & J.
Tinnunculus moluccensis, Sclater, loc. cit.
7. Ninox forbesi, Sclater, loc. cit.

Supra rufescenti-brunnea, fere unicolor, in alarum tectricibus et scapularibus fasciolis albis variegata; fronte et superciliis albis; alarum

* See Reports of the Timor-laut Committee in Rep. Brit. Assoc. 1881, p. 197, 1882, p. 275, and 1883.

remigibus terreno-brunneis, nigro transfasciatis; subtus dorso concolor, mento albicante, ventre albo transfasciato; tarsis, omnino plumosis, cum subalaribus rufis unicoloribus; alarum et caudæ pagina inferiore pallide corylino-brunnea nigro regulariter transfasciata; rostri nigri apice flavicante; digitis fuscis setis obtectis: long. tota 11·0, *alæ* 7·4, *caudæ* 4·5, *tarsi* 1·3.

Hab. Lutur, Timor-laut.

Obs. Sp. quoad colores *N. hantu* maxime affinis, sed facie alba fasciis ventris albis, et alis subtus nigro vittatis diversa.

The single specimen of this Owl is a male, obtained at Lutur on August 9, 1881. It is noted: Irides golden; bill pale cinereous; feet pale yellow, covered with bristly hairs; soles of feet nearly orange."

I have dedicated this apparently distinct species to its discoverer, Mr. Henry O. Forbes, F.Z.S.

8. Strix sororcula, Sclater.

Supra terreno-fusca flavicante variegata, et punctis rotundis albis regulariter aspersa; disco faciali amplo alba, margine nigricanti-brunneo circumdato; macula anteoculari nigricante; remigibus fuscis, nigro transfasciatis, in pogoniis externis fulvo maculatis et albido vermiculatis; cauda nigricante, taniis quinque fulvis transfasciata et albido vermiculata; subtus alba, præcipue in ventre macrulis rotundis nigris fulvo cinctis aspersa, subalaribus ventre concoloribus; tarsis postice fere omnino plumulis obtectis, antice digitos versus setis paucis obsitis; rostro et pedibus carneis: long. tota 11·5, *alæ* 8·5, *caudæ* 3·5, *tarsi* 2·2.

Hab. Larat, ins. Tenimberensem.

Obs. Species *novæ-hollandiæ* affinis et ejusdem formæ, sed crassitie valde minore, tarsorum plumis brevioribus et dorsi punctis rotundioribus distinguenda

Mr. Sharpe, who has kindly examined the single skin of this Owl sent, is of opinion that it belongs to a species allied to *Strix novæ-hollandiæ*, but easily recognisable by its inferior size.

The example was obtained on Larat on the 24th of September, 1882, and is labelled:—"Female: irides dark brown; bill, legs, and feet flesh-colour; legs covered with flesh-coloured bristles."

II. Psittaci.

9. Tanygnathus subaffinis, Sclater.

Flavicanti-viridis, in pileo et capitis lateribus prasinus, in dorso postico cæruleo lavatus; alis viridibus; scapularium apicibus, campterio alari extus et tectricum majorum marginibus cæruleis; secundariorum tectricibus flavo marginatis; cauda supra viridi, apice flavicante, subtus obscure aurulenta; subalaribus viridibus cæruleo mixtis, alarum pagina inferiore nigricante; rostro ruberrimo; pedibus nigris; long. tota 13·0, *alæ* 9·5, *caudæ* 6·0.

Hab. Larat, ins. Tenimberensem.

Obs. Species *T. affini* maxime affinis, sed dorso flavicante viridi vix cæruleo lavato, diversa.

The single specimen is a female, obtained in Larat on August 8, 1882. "Irides cream-yellow, with inner ring of pale gamboge."

10. Geoffroius keiensis, Salvad.

G. timorlaoensis, Meyer, loc. cit.

The *Geoffroius* determined by Dr. Sclater to be *G. keyensis* (Salv.) has been elevated into a new species, *G. timorlaoensis* by Dr. Meyer.

He admits that the separation is based on very minute differences, which, however, he believes will be found constant. "*Geoffroitus* [*timor-laoensis*], *G. keyensi*, Salva., simillimus, sed minor et primariæ extimæ pogonio externo virescenti diversus." On comparing the Timor-laut birds with Ké specimens in the British Museum determined by Count Salvadori, the case stands as follows:—Timor-laut skins vary from 240–290 millim., while *G. keyensis* (Salv.) ranges from 235–255 millim. Length of wing in the former 165–170 millim., and in *G. keyensis* (Salv.) 175–185 millim. The tail is shorter in *G. timorlaoensis* than in *G. keyensis*; while the tarsus agrees in both. In Timor-laut specimens the external web of the outermost primary, where in the upper portion the colour is *blue*, and in the lower *green*, exactly agrees with a specimen from Ké, of the *Challenger* collection, determined as *G. keyensis* by Salvadori. Both these are males. A female from Ké has the same region of this feather blue throughout its length; while a female from Timor-laut has a very narrow yellowish edge to the green-blue margin of the primary. A female obtained by the *Challenger* naturalists, also determined by Salvadori as *G. keyensis*, is identical in coloration, while, lastly, the colour of the under surfaces of the wings can scarcely be detected to differ. It would appear, therefore, so far as the skins from Timor-laut and Ké, in the British Museum and in my own collection, afford material for forming an opinion, that these differential characters will not be found to have the constancy that Dr. Meyer has expected. The wing measurements certainly are less in Timor-laut specimens. It is probable that the differences in coloration are due to age only, and are not sufficient to separate the Ké from the Tenimber birds. [H. O. F.]

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11. Eclectus riedeli, Meyer, P. Z. S. 1881, p. 917. Sclater, loc. cit. Pl. XXVI.

Dr. A. B. Meyer has accurately described the female of this fine species.

All the green skins are marked "♂," and all the red "♀." The male not yet having been described, I give short diagnoses of both sexes.

♂. *Læte viridis, capite clariore, subcaudalibus flavicante tinctus; subalaribus et hypochondriis coccineis; campterio alari et remigum primariorum marginibus externis et secundariorum (extus dorso concolorum) apicibus cæruleis; alarum pagina inferiore nigra; cauda supra viridi dorso concolori, subtus nigra, apice plus quam semipollicari abrupte flavo; rectrice una utrinque extima in pogonio exteriore cæruleo notata; rostro superiore rubro, apice flavicante; inferiore nigro: long. tota* 11·8, *alæ* 8·7, *caudæ* 4·6.

♀. *Rubro punicea, capite et corpore subtus coccineis; crisso flavo; campterio alari et remigum primariorum marginibus externis cæruleis; cauda supra ad basin viridi in rubrum transeunte, ad apicem late flava, subtus flava ad basin nigricante; rostro nigro; crassitie paulo minore.*

Hab. insulus Tenimberenses.

Of the four skins in the present collection, two males (green) are from Larat, and one male and one female from Lutur.

As I have remarked (P. Z. S. 1883, p. 49), there can be no longer any doubt that *Eclectus riedeli* is quite a distinct species of the genus, characterised by the broad well-defined yellow tail-end of the male, and by the absence of the blue on the back of the neck and on the belly in the female. Neglecting *E. westermanni* and *Eclectus cornelia*, of which we do not know

the opposite sexes or the localities, we are now acquainted with both sexes and the patriæ of four species of these anomalous Parrots, distributed as follows:—

(1) *E. pectoralis* (Salvad. op. cit. p. 197), of New Guinea and the Aru and Ké islands, extending to New Britain, New Ireland, and the Solomon Islands.

(2) *E. roratus* (Salvad. p. 206), of the island group of Halmahera, *i.e.* Halmahera, Ternate, Batchian, Morty, and Obi.

(3) *E. cardinalis* (Salvad. p. 210), of the island group of Ceram, *i.e.* Ceram, Amboina, and Boru.

(4) *E. riedeli*, of the Tenimber group.

The males of these four species are very similar in colouring; but with the help of Dr. Salvadori's diagnosis of the first three we may separate them as follows:

A. Majores: cauda supra cæruleo variegata.
  Cauda minus cærulea . . . . . (1) *pectoralis.*
  Cauda magis cærulea . . . . . (2) *roratus.*
B. Minores: cauda supra viridi, subtus nigra.
  Cauda apice angusto flavicante . . . . (3) *cardinalis.*
  Caudæ fascia apicali distincte flava . . . (4) *riedeli.*

The female of *E. riedeli*, as already mentioned, is very easily distinguished from the same sex of the first three species by the absence of the blue neck-band and of the blue on the abdomen. As regards its yellow under tail-coverts and yellow tail-end, it comes nearest to *E. roratus.*

12. Eos reticulata, S. Müll.
13. Neopsittacus euteles, T.
14. Cacatua sanguinea, Gould.

To my great surprise this *Cacatua* is not *C. citrinocristata*, as I had suspected. The original specimens of *C. sanguinea* were obtained at Port Essington in N. Australia; so that its occurrence in the Timor-laut group is not after all so very remarkable.

III. Picariæ.

15. Sauropatis chloris, Bodd.
16. S. australasiæ and *var.* minor, Meyer, n. var.
17. S. sancta, V. & H.

IV. Passeres.

18. Piezorhynchus castus, Sclater.

Monarcha castus, Scl. P. Z. S. 1883, loc. sup. cit.

Supra niger; pileo et regione auriculari albis, fronte et tænia nucham cingente nigris circumdutis; dorso summo tæniæ nuchali proximo, uropygio et tectricibus alarum minoribus cum scapularium marginibus externis albis; subtus albus, gutture nigro, maculis tribus albis ornato; cauda alba, rectricibus tribus externis albo late terminatis; subalaribus et remigum pogoniis internis albis; rostri plumbei tomiis albicantibus; pedibus plumbeis: long. tota 5·7, *alæ* 2·7, *caudæ* 2·8.

Hab. Lutur, Timor-laut.

Obs. Affinis *M. leucoti*, sed gula nigra distinctus.

The single example is marked "Male: irides reddish brown; bill lavender; legs and feet ditto; September 1882."

HETERANAX, Sharpe, gen. nov. (ἕτερος = alter, ἄναξ = rex) is closely allied to the Australian genus *Sizura*; but the bill is narrower, less flattened and strongly compressed, so that it is higher than broad at the notrils.

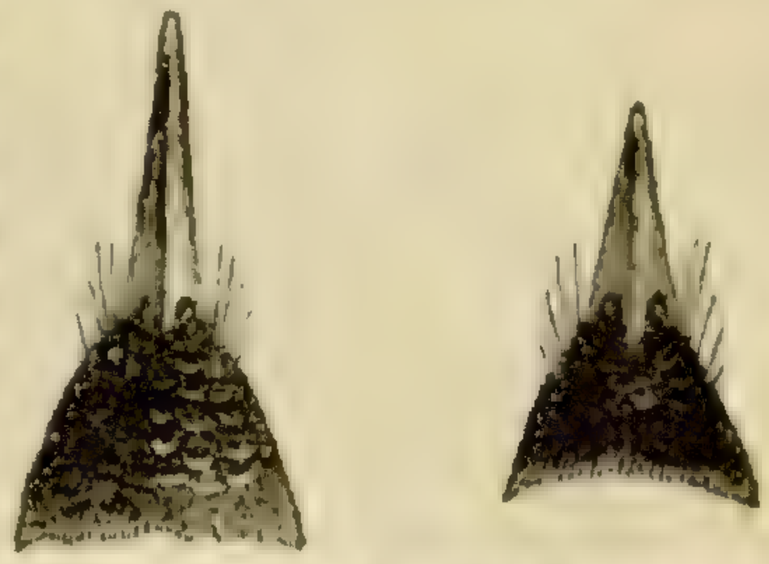
19. HETERANAX MUNDUS, Sclater.

Monarcha mundus, Scl. P. Z. S., 1883, loc. cit.

Supra obscure cinereus, fronte lato, capitis lateribus et tectricibus alarum totis nigris; subtus albus, mento et plaga gulæ media nigris; cauda nigra, rectricum quatuor lateralium apicibus latis albis; subalaribus albis, remigum pagina inferiore cinerea; rostro compresso, colore plumbeo, gonyde ascendente; pedibus nigris; long. tota 6·0, *alæ* 3·2, *caudæ* 2·7.

Hab. Ins. Tenimberenses, Larat et Yamdena.

This species seems to be allied to *M. morotensis*, *M. bernsteini* and *M. nigrimentum*, but has an unusually compressed bill, of which the gonys is slightly curved upwards.



UPPER SURFACE OF BILL OF *H. mundus*. UPPER SURFACE OF BILL OF *P. castus*. (WITH PERMISSION OF COUNCIL OF ZOOL. SOC.)

20. MONARCHA NITIDUS, Salvadori.

21. RHIPIDURA HAMADRYAS, Sclater.

Supra castanea, in capite postico et cervice magis fuscescens, fronte dorso concolore; subtus pallide cervina, torque gutturali nigro; gula alba; alis caudaque nigricantibus, illis rufo anguste marginatis; hujus rectricibus externis cinerascente albo late terminatis; rostro et pedibus nigris: long. tota 5·7, *alæ* 2·3, *caudæ* 3·2.

Hab. Larat, ins. Tenimberensem.

Obs. Proxima *R. dryadi* (Gould, B. N. G. pt. ii. pl. 11), sed cervice postica rufescente nec fusca et alarum tectricibus rufo marginatis, dignoscenda.

22. RHIPIDURA FUSCO-RUFA, Sclater.

Supra obscure terreno-fusca, in dorso rufescenti tincta; alis nigricantibus, tectricum minorum apicibus et secundariorum marginibus externis late rufis; subtus rufa, mento et gutture toto ad medium pectus albis; subalaribus rufis; remigum marginibus internis fulvis; caudæ nigricantis rectricibus tribus externis totis et paris proximi apicibus rufis; rostro et pedibus nigris. Long. tota 7·0, *alæ* 3·3, *caudæ* 3·4.

♀. *Mari similis.*

Hab. insulas Tenimberenses Larat, Molu et Lutur.

Obs. Sp. rostro robusta late, cauda parum graduata fusco et rufo bipartita insignis.

There are 14 specimens of this apparently new and very distinct *Rhipidura* in the collection, from the three localities above mentioned. The irides are marked "dark brown," and the legs and feet "black."

The bill is broad and robust, and the rectrices but slightly graduated the external being only about 0·4 inch shorter than the middle pair; so that the species would appear to come in the same division as Nos. 12 and 13 of Count Salvadori's list.

23. RHIPIDURA OPISTHERYTHRA, Sclater.

Supra cinerasceo-fusca, dorso postico castaneo-rufa; loris albidis; alarum nigricantium marginibus externis rufescentibus; subtus pallide fulva, gutture albo, crisso castaneo, hypochondriis rufescenti lavatis; caudæ elongatæ et valde graduatæ rectricibus rufescentibus, supra castaneo extus marginatis; rostro superiore nigro, inferiore ad basin et pedibus pallidis: long. tota 6·7, *alæ* 3·4, *caudæ rectr. med.* 3·8, *ext.* 2·5, *tarsi* 0·9.

Hab. Insulas Tenimberenses Larat et Maru.

Obs. Sp. gutture albo et dorso postico et crisso castaneis, sicut videtur, facile dignoscendo.

The two specimens of this species in the collection are both marked as ♀ ; but the male would probably not differ in coloration. "Irides dark brown; upper mandible sooty brown, lower mandible same at top, but pale flesh colour at base; feet lavender pink."

This species belongs to the section with small bill, and the tail-feathers much graduated, the outer pair being 1·3 in. shorter than the middle pair. Below, the tail is pale, rufous, the inner webs of the rectrices passing into blackish. Above, the outer tail-feathers are margined externally at their bases with the chestnut-red of the rump.

24. Myiagra fulviventris, Sclater.

Supra plumbea, capite et dorso nitore cæruleo tinctis ; alis et cauda fusco-nigricantibus ; subtus saturate castaneo-rufa, abdomine et subalaribus fulvis ; remigum marginibus interioribus albicantibus ; rostro et pedibus nigris : long. tota 5·8, *alæ* 2·7, *caudæ* 2·7.

Hab. Larat, ins. Tenimberensem.

Obs. Proxima *M. rufigulæ* ex Timor, sed ventre et subalaribus fulvis distinguenda.

"Irides dark brown, bill lavender-blue, legs and feet black:" The type was obtained in Larat on August 2nd, 1882; and others later.

25. Micræca hemixantha, Sclater.

Supra flavicanti-olivacea ; alis caudaque fuscis dorsi colore marginatis, loris et linea superciliari obsoleta flavidis ; macula auriculari fusca ; subtus flava, remigum marginibus internis albidis ; subalaribus flavis ; rostri fusci mandibula inferiore pallida ; pedibus nigris : long. tota 4·8 *alæ* 2·9, *caudæ* 2·1.

Hab. Larat et Lutur.

Obs. Species *Pœcilodryadi papuanæ*, quoad colores, fere similis, sed, ut videtur, generi *Micræcæ* apponenda.

26. Artamides unimodus, Sclater.

Graucalus unimodus, P. Z. S. 1883, p. 55.

The collection contained two males and three females of this species. The sexes are not quite similar, as will be seen from the subjoined diagnoses.

♂ *Cinereus ; fronte, loris et capitis lateribus cum gutture toto ad medium pectus anco-nigris ; alis et cauda nigris illis cinereo extus marginatis ; subalaribus pallide isabellinis ; remigum pagina inferiore albicanti-cinerea ; rostro et pedibus nigris : long. tota* 13·5, *alæ*, 7·3, *caudæ* 6·5, *tarsi* 1·3.

♀ *Mari similis, sed paulum obscurior et colore nigro nisi in loris carens ; crassitie paulo minore.*

Hab. Larat, ins. Tenimberensem.

Obs. Species *Graucalo cæruleo-griseo* affinis, sed colore corporis cinerascentiore et remigibus intus non albis distinguenda.

27. A. timorlaoensis, Meyer, in 'Zeit. f. die Ges. Ornith.' 1884, p. 10.

28. Graucalus melanops, V. & H.

29. Lalage mœsta, Sclater.

Supra sericeo-nigra ; superciliis brevibus et uropygio albis ; alis nigris, tectricibus minoribus et majoribus et secundariis albo late terminatis ; corpore subtus, subalaribus et remigum pogoniis internis ad basin omnino

albis ; cauda nigra, rectricibus duabus externis albo terminatis ; rostro et pedibus nigris : long. tota 6·2, *alæ* 3·7, *caudæ* 3·3.

Hab. Inss. Tenimberenses.

Obs. Affinis *L. atro-virenti* et *L. tricolori*, sed supercilii s curtis albis dividenda.

30. Artamus leucogaster, Val.

A. musschenbroeki, Meyer, loc. sup. c.t.

Hab. Larat, ins. Tenimberensem.

Artamus musschenbroeki, is the name proposed by Dr. Meyer for the Timor-laut Wood-Swallow, which has been determined by Dr. Sclater as *A. leucogaster*, Val. (P. Z. S. 1883, pp. 51 and 200). Of the *Artamus* from Dr. Meyer's identical locality I have in my own collection three specimens. I have examined carefully seventeen others from different localities, in the very long series in the British Museum derived from *Celebes*, the *Philippines*, *Sumatra*, Java, Lombock, Flores, Timor, Batjian, Buru, *Halmaheira*, Goram, Aru, Batanta, and from N. Australia. The species in the Dresden Museum from the underlined localities are admitted by Dr. Meyer to belong to *A. leucogaster*. It is impossible to separate my Timor-laut skins from specimens collected in Zebu by the *Challenger* Expedition, and determined by Lord Tweeddale (P. Z S., 1877, pp. 544–545). The colour in both is absolutely the same. Lord Tweeddale, however, remarks on the difference of dress—"one in which the upper plumage is of a light bluish and cinereous colour, the other where it is of a more smoky brown and bluish ash. This does not seem to depend on sex ; for one of these examples (Zebu 362) is marked ♂, while I possess a Luzon example exactly similar, which Dr. Meyer determined to be a ♀. The other Zebu example (No. 370) is marked ♀, and is in the paler bluish-grey attire." I feel satisfied, after examining the specimens in the British Museum and in my own collection, that the difference in coloration is one due to age, for in young birds, the plumage is lighter than in the adult state. Dr. Meyer's observation that the dark mantle reaches, in Timor-laut skins only, just to the root of the tail, while in *A. leucogaster* it overlaps by about a centimetre, is, in as far as the series referred to enables an opinion to be formed, one not sufficiently constant to support specific separation. In several Timor-laut specimens examined, the dark plumage overlaps the tail more than 1 centimetre, and even more than in others from different parts of the Archipelago which have been hitherto recognised as *A. leucogaster*. In skins of *A. leucogaster* from Mysol and Macassar, the mantle is just conterminous with the root of the tail. Really, however, the absolute constancy of these measurements can be determined only with accuracy in the flesh, for the way in which the skin is manipulated will increase or diminish them by several centimetres. The same holds with regard to another character given as differential—the greater amount, in Timor-laut specimens, of white on the rump and upper tail-coverts. In my own specimens the white on the rump varies from 22-31 millim. in length, while in eight other skins from different regions of the Archipelago the range is from 26-32 millim., giving in the latter indeed a wider zone than in those from Timor-laut. In the long series of British Museum skins, the *white tips of all but the two middle tail-feathers*, another of Dr. Meyer's differential characters, is quite inconstant. In several Timor-laut skins not only these two tail feathers, but several others of the remiges, are without a white band, while in some examples it is even less than in undisputed *A. leucogaster*. In *young* birds the white tips are very pronounced, not on the remiges only, but on the primaries and secondaries of the wing also. The Philippine (Zebu) birds, already

referred to, have the tips of the remiges quite as broad as in those from Timor-laut. In a Lombock specimen ("ex Stevens") the tips of *all* the feathers are white; a Batanta and a New-Holland specimen have no white tips at all; one from, Halmaheira and one from Buru (both from Mr. Wallace's collection) except in one feather, have no white on the remiges; yet all of them have been determined to be, and are undoubtedly *A. leucogaster* (Val.) [H. O. F.]

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31. Dicruropsis bracteatus, Gould.
32. Pachycephala arctitorquis, Selater, loc. cit, Pl. XIII.

P. kebirensis, Meyer, op. sup. cit.
P. riedelii, Meyer, op. sup. cit.

Supra cinerea, alis caudaque nigris cinereo limbatis, pileo nucha et capitis lateribus nigris; subtus alba, torque jugulari angusto nigro; subalaribus et remigum marginibus interioribus albis; rostro et pedibus nigris: long. tota 5·5, alæ, 3·0, caudæ 2·2. Fem. *Supra fusca, in pileo rufescens; alis nigris extus rufo limbatis; subtus alba, obsolete nigro striata.*

Hab. Larat, ins. Tenimberensem.

Dr. Meyer, in the paper referred to, has described two new species of *Pachycephala*, whose names are given above as synonyms. If he is correct in his determinations we have the curious fact that, notwithstanding my more thorough examination of a wider field, which included the region whence he obtained his birds, the whole series obtained by me contained no *females* of *P. arctitorquis* and no *males* of *P. riedelii* (were Dr. Meyer's specimens sexed?); while those who made the collection examined by Dr. Meyer, obtained in Babbar (an island at no great distance to the W. of Yamdena) *females* of *P. arctitorquis*, and evidently *no males* (so recognised by Dr. Meyer), and females of *P. kebirensis* (Meyer), without *one* of its *males*. I dai'y saw the collections made in Timor-laut by the Amboinese hunters making this collection, and I feel confident that no species of *Pachycephala*—one of the groups I am particularly interested in—was obtained by them which was not also in my collection. After comparing Dr. Meyer's descriptions with the long series I have of this bird, nearly all of which Dr. Sclater had before him when writing his original description, and which contains birds in almost every stage of plumage, from the young bird to the fully adult, I have little hesitation in affirming that *P. arctitorquis*, (♀ Meyer), from Timor-laut and Babbar, is but the *immature male*, and *P. kebirensis* (Meyer) the nearly fully adult *female* of *P. arctitorquis*, in which the colour of the bird when fully adult is black; while *P. riedelii* is a still younger *female* of the same species. From this it would seem clear to me that *P. arctitorquis*, Sel., occurs in Babbar also, for the examples before Dr. Meyer from that island were young males and immature females, while from Timor-laut he had adult males, immature males (♀, Meyer), and still younger females (*riedelii*, Meyer). [H. O. F.]

33. P. fusco-flava, Sclater, loc. cit., Pl. XXVII.; Forbes, P. Z. S., 1883, pl. 588, Pl. LIII.

Obs. Similis *P. leucogastro*, sed torque angusto distinguenda.

The pair of these species were obtained in Larat, in the first week of August 1882. The iris is marked "reddish brown" in the male, and "dark brown" in the female; the feet "blue-black" in the male, and "lavender-pink" in the female.

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34. Dicæum fulgidum, Sclater.
(Figured in Gould's 'Birds of New Guinea,' *part* 16.)

Supra nitide purpurascenti-nigrum; subtus album coccineo perfusum; hypochondriis olivaceo mixtis; subalaribus et remigum pogoniis internis albis; rostro et pedibus nigris: long. tota 3·6, *alæ* 2·0, *caudæ* 1·1.

Hab. Larat et Lutur.

Obs. Similis *D. keiensi* et *D. ignicolli*, sed ventre toto coccineo perfuso distinctum.

There are two "male" examples of this *Dicæum* in the present collection—one from Larat (1.8.82) and one from Lutur (19.9.82). Both are labelled, "Irides dark brown; legs and feet black."

35. Myzomela annabellæ, Sclater; fiig. in Gould, 'B. N. Guin.,' Pt. 16.

Nigra; capite cum gutture toto undique et dorso postico coccineis; ventre medio et remigum marginibus externis strictissimis olivaceis; subalaribus et remigum pogoniis internis albis; rostro et pedibus nigris: long. tota 3·5, *alæ* 2·0, *caudæ* 1·3.

Hab. Lutur, Timor-laut.

Obs. Sp. ad *M. erythrocephalam* et species huic affines adjungenda, corpore coloris nigro et crassitie minore insignis.

The single specimen was obtained September 22nd at Lutu. It is marked "Male: irides dark brown: bill black; legs and feet dirty green." I have named it by, request of the discoverer, after his wife, who accompanied him in his perilous travels.

36. Stigmatops salvadorii, Meyer, op. cit.

Stigmatops squamata, Salvad. Sclater, P. Z. S., 1883, p. 198.
Nectarinia sp. inc. Sclater, P. Z. S., 1883, p. 51.

One of the most frequently met with birds. Feeds at the cocoanut flowers. The [first instalment of the] collection contained two skins in bad condition (marked "♀") which I thought might probably be referable to a female of some species of *Nectarinia*. The [second instalment] comprehends nine specimens of the same bird of both sexes. It is evidently a Melipliagine bird of the genus Stigmatops, and, so far as I can tell, without actual comparison with the types, inseparable from *S. squamata* of Salvadori. This species was discovered by Rosenberg on Khor Island between the Ké group and Ceram-laut, and may therefore probably also occur in the Tenimber group from which Khor lies not very far north.

37. **Philemon timorlaoensis, Meyer.**

P. plumigenis, Sclater, P. Z. S., 1883, p. 199.

Philemon timorlaoensis is the name proposed by Dr. Meyer for the species designated *P. plumigenis* by Sclater (P. Z. S., 1883, pp. 51 & 195). The Timor-laut bird certainly differs from that from Ké, but the differences are scarcely to be formulated in words. The Tenimber bird seems intermediate between the Buru and Ké birds. Dr. Gadow, in the 9th vol. of the Cat. of Birds, has not separated the species, nor has Mr. Sharpe, in the 16th part of Gould's "Birds of New Guinea," though he has expressed doubts as to their identity. [H. O. F.]

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38. Zosterops griseiventris, Sclater.

Supra late viridis, annulo periophthalmico distincto albo; alis caudaque nigricantibus viridi limbatis; subtus pallide grisea, in ventre medio albicantior, gula et crisso flavis; subalaribus et remigum marginibus internis albis, cumpterio flavido; rostro pallide corneo, pedibus pallide fuscis; long. tota 4·7, *alæ* 2·5, *caudæ* 1·7.

Hab. Larat, Lutur, et Molu insulas Tenimberenses.

There are sixteen specimens of this apparently new *Zosterops* in the

present collection, obtained at various dates in the localities above mentioned. The irides are noted as "reddish brown."

The species belongs to the group of *Z. albiventris*; but appears to be distinguishable by its greyish abdomen, which is only whiter in the middle line.

39. Gerygone dorsalis, Sclater.

Supra brunnescenti-castanea, alis caudaque nigris dorsi colore limbatis, pileo et nucha murino-brunneis; subtus alba, hypochondriis rufescenti lavatis; subalaribus albis; caudæ rectricibus subtus in pogoniis interioribus nigricantibus macula versus apicem alba prælitis; rostro et pedibus nigris: long. tota 4·0, *alæ* 2·1, *caudæ* 1·6, *tarsi* 0·8.

♀. *Mari similis.*

Hab. Larat, Lutur et Molu, insulas Tenimberenses.

I was rather uncertain as to the correct position of this little bird, which is quite distinct from anything that I am acquainted with; but Count Salvadori, to whom I have sent a skin for examination, kindly tells me it is a *Gerygone*. The bill is rather compressed, and the tarsi are long and slender. The third, fourth, fifth, and sixth primaries are nearly equal and longest. The irides are noted as black.

40. Oriolus decipiens, Sclater.

Memeta decipiens, Scl. P. Z. S., 1883.

Fuscus fere, unicolor, superciliis albidis, pileo nigricanti striolato; subtus paulo dilutior, gutture et cervice antica albis, præcipue ad latera nigro guttulatis; pectoris summi plumis quibusdam nigricanti striolatis; regione auriculari nigricante; rostro et pedibus nigris: long. tota 11·8, *alæ* 6·5, *caudæ* 5·0.

Hab. Larat, insulam Tenimberensem.

Obs. Similis *M. bouroensi*, sed gula albida nigro transversim guttulata et pectoris summi plumis nigricanti striolatis distinguendus.

Two specimens of this *Mimeta*, marked "irides dark brown," are in the collection. They so closely resemble *Philemon plumigenis* in general appearance, that I had at first marked them as of that species. *Cf.* Wallace, P. Z. S., 1863, p. 26, on a similar case of mimicry in another species of this genus.

41. Geocichla machiki, H. O. Forbes.

Geocichla sp. inc., Sclater, P. Z. S., 1883, loc. sup. cit.

The species of *Geocichla* is an adult male, intermediate between *Geocichla rubiginosa* from Timor and *G. erythronota* from Celebes. The general colour of the upper parts is olive-brown, shading into slaty brown on the head and into chestnut on the rump and upper tail-coverts; lores white, ear-coverts mottled white and slaty-brown; wings brown; lesser wing-coverts olive-brown, broadly tipped with white; innermost secondaries russet-brown, obscurely tipped with white; tail-feathers russet-brown, the outer feathers on each side broadly tipped with dull white; chin, throat, and breast buffish white, the rest of the under parts white, the feathers on the flanks broadly tipped with crescentic spots of black; axillaries—basal half white, terminal half black; under wing-coverts—basal half brown, terminal half white; basal half of inner web of secondaries and basal portion of many of the primaries white; upper mandible sooty grey, lower yellow; irides ash-brown; legs, feet, and claws pale flesh-colour. Wing, 4½ inches, tail 3·2, culmen 1·05, tarsus 1·4. (No. in collection 583 g.)

I propose that this new species should bear the name *G. machiki*, as a small mark of remembrance of Dr. Julius Machik, of Buda Pesth, Surgeon-

Captain in the Dutch Army, and of appreciation of his extreme kindness and hospitality, and of the greatest possible assistance rendered by him to me in Sumatra, and more especially in Amboina to my wife and myself, both before and after our return from the Tenimber Islands. Dr. Machik is well known in the Archipelago for his extensive collections of Molusca fishes, snakes, and insects. [H. O. F.]

42. Geocichla schistacea, Meyer, op. cit.
43. Pitta vigorsii, Ged. fide Meyer.
44. Munia molucca, L.
45. Erythrura trichroa, Kittl.
46. Calornis gularis, G. R. Gr.
    C. metallica, Sclater, P. Z. S. loc. sup. cit.
    C. circumscripta, Meyer, op. sup. cit.

The species of *Calornis* from the Tenimber Islands has been distinguished from *C. metallica* as a new species, *C. circumscripta* by Dr. Meyer. I have a large series of skins in my collection, and that they belong to a species distinct from *C. metallica* is undoubted, and, as Dr. Meyer observes, they can, when mixed up with any number of species of *Calornis*, be unhesitatingly picked out by the coloration of the throat. The throat-plumes in *C. metallica* are prominently longer and more mucronate than those in the Timor-laut specimens. The violet of the mantle, however, contrary to the note of Dr. Meyer, has the blue-green reflexions observable in *C. metallica* quite distinct in most of my specimens, if the eye be "placed between the bird and the light" in position A, as described by Dr. Gadow (P. Z. S. 1882, p. 409), that is with "the eye and the light almost in a level with the planes to be examined." A species of *Calornis* discovered by Mr. Wallace in Mysol (of which the type is in the British Museum) was named *C. gularis* by G. R. Gray; but was considered by Count Salvadori (the label bearing the name in his handwriting) as *C. metallica*, while it remained unique. After comparison of this skin with Timor-laut specimens, the two are *unquestionably* identical. *C. circumscripta* (Meyer) must, therefore, be considered henceforth a synonym of *C. gularis*, G. R. Gr., which must now be removed from being a synonym of *C. metallica* to specific rank, confirming the opinion expressed in 1876 ('Ibis,' p. 46) by Mr. Bowdler Sharpe, who says: "I must pronounce this, contrary to Lord Walden's opinion, a very good species, distinguished by its purple throat and small bill, the culmen only measuring ·65 inch, as against ·85 in *C. viridescens*." This measurement is not the only one by which the species can be distinguished, for the plumage in every specimen is so constant that the skins cannot easily be confounded with any other. *C. gularis* is slightly less, and more brightly metallic—a more beautiful bird, in my opinion, even than the true *C. metallica*; the purple of the throat, which is more chastely and delicately feathered than in *C. metallica*, is separated from the purple of the back and upper breast by a *narrow* and *very bright* green band. The total length of the bird in 11 specimens ranged from 210-250 millim. Count Salvadori (P. Z. S., 1878, p. 89) remarks: "Some specimens (of *C. metallica*) have the throat more purplish than others, one from Mysol (*C. gularis*, Gray) cannot be separated from others from Halmaheira and Cape York." I have not seen any Halmaheira specimens; but the Cape-York bird undoubtedly differs by the purple on the breast, which is green in *C. gularis*: the green neck-band is much broader, and the throat is more markedly green and without purple. It has, I believe, been separated as *C. purpurascens*, Salv. The Admiralty-Island *Calornis* is somewhat similar to *C. gularis*, but is at

once distinguishable by the absence of purple on the back; the head is purple; and it is known as *C. purpureiceps*. [H. O. F.]

47. Calornis crassa, Sclater.

Obscure cineracea-viridis nitore chalybeo; subtus, præcipue in ventre, paulo magis cineracea; alis caudaque nigris extus dorsi colore lavatis; remigum marginibus interioribus fuliginosis; rostro et pedibus nigris; cauda fere æquali aut paulum rotundata: long. tota 7·3, *alæ* 4·1, *caudæ* 2·8.

Fem. *Supra cinerascens, striis scapurum nigris variegata; alis caudaque fusco nigris; subtus alba nigro flammulata; crassitie fere eadem.*

Hab. Larat, ins. Tenimberensem.

Obs. Species cauda fere æquali, corpore crasso, rostro robusto et colore maris uniformi notabilis.

Both male (August 1st) and female (August 8th) are marked "Irides dark brown; bill, legs, and feet black."

48. Corvus latirostris, Meyer, op. sup. cit.
Corvus validissimus, Sclater, loc. cit.
49. Eurystomus pacificus, Lath. fide Meyer, op. sup. cit.
50. Caprimulgus macrurus. Horsf.
51. Hirundo javanica, Sparrm.

V. Columbæ.

52. Ptilopus wallacii, Gr.
53. D. leitiensis, Schl. fide Meyer.
54. P. xanthogaster, Wagl.
P. flavovirescens, Meyer, op. sup. cit.

The designation *Ptilopus flavovirescens* has been proposed by Dr. Meyer for the Timor-laut Pigeon determined by Dr. Sclater as *P. xanthogaster* (Wagl.). The difference lies, he notes, in the "Gelbgrünlichgraue" of the head and neck. From a careful comparison of my own skins with those in the British Museum, I feel confident that the differences observed by Dr. Meyer will be found to be those due to age only. Very young birds have a grey band over the forehead, and the rest of the head with the neck and back nearly of the same shade of green; with advancing age we find every shade of green and yellowish-green to Dr. Meyer's "Gelbgrünlichgraue." The head of the fully adult bird is purplish-grey, each feather having a pale yellow submarginal crescent across it.

Some of the skins obtained by me differ as to head and neck in no respect from specimens brought by Mr. Wallace from Banda; others have the head and neck of a grey colour tinctured with every shade through green-blue to yellow, differing according to the age of the birds. I cannot detect in the specimens I have, any difference in breadth of the "Gelb der Kehle" as compared with Mr. Wallace's specimens; nor is the *breast shield* constantly of one shade in all the specimens I have examined. In the Banda example (of Wallace) it is darker than any Timor-laut specimen before me. In agreement with all those in the British Museum, my Timor-laut specimens have the outer margin of the primaries and secondaries as in Salvadori's description, "flavo-marginatis." [H. O. F.]

55. Carpophaga concinna, Wall.
56. C. rosacea, Temm.
57. Myristicivora bicolor, Scop.
58. Macropygia timorlaoensis, Meyer, op. sup. cit.
Macropygia keiensis, Salv.
Macropygia sp. inc., Sclater, P. Z. S. 1883, loc. sup. cit.

59. Spilopelia tigrina, T. fide Meyer, op. sup. cit.
60. Geopelia maugei, Temm.
61. Chalcophaps chrysochlora, Wagl.

VI. Gallinæ.

62. Megapodius tenimberensis, Sclater.

Supra brunnescenti-olivaceus, in cervice magis cinereus, in dorso postico magis brunnescens; pileo suberistato interscapulio concolore; subtus cineraceus olivaceo tinctus; capitis lateralis et gulæ pelle rubra plumis paucis obsita; subalaribus ventre concoloribus; rostro flavo; tarsis antice nigris postice rubris, digitis nigris; long. tota 11·5 *alæ* 9·6, *caudæ* 3·5, *tarsi* 2·8.

Hab. Firinun et Lutur, ins. Tenimberensem.

Obs. Species pedum colore ad *M. geelvinkianum* corporis pictura magis ad *M. tumulum* appropinquans.

There are two specimens of this apparently new Megapode in the collection. One from Lutur, Timor-laut, obtained September 22nd, is marked "Irides dark brown; bill pale yellow; legs in front black, but front of knees red, back of legs red; feet black." The other, from Kirimun, is labelled "Iris brown; bill pale yellow; legs and feet red." But the colours of these last-named parts, so far as can be told from the dry skins, do not materially differ from those of the first specimen; and the two birds agree in plumage, except that the specimen from the islet of Kirimun is rather more reddish on the face.

VII. Grallatores.

63. Orthorhamphus magnirostris, Geoff.
64. Oedicnemus grallarius, Lath.
65. Charadrius fulvus, Gm.
66. Ægialitis geoffroyi, Wagl.
67. Lobivanellus miles, Bodd.
68. Totanus incanus, Gm.
69. Numenius variegatus, Scop
70. Ardea sumatrana, Raffles.
71. A. novæ-hollandiæ, Loth.
72. Herodias alba, L.
73. Demigretta sacra, Gm.
74. Nycticorax caledonicus, Gm.
75. Porphyrio melanopterus, Temm.

VIII. Natatores.

76. Nettapus pulchellus, Gould.
77. Dendrocygna guttata, Müll.
78. Tadorna radjah, Garn.
79. Sterna melanauchen, T.
80. Onychoprion anæsthetus, Scop.

Dr. Sclater concludes his paper with the following remarks, which I reproduce, as the recent discoveries of Mr. Riedel's collectors have not materially modified the conclusions arrived at by the writer in 1884: "I will say a few words concerning the general character of the avifauna of the Tenimber Islands so far as it is indicated by this collection. It is quite evident that the prevailing facies of this ornis is, as might have been expected, predominantly Papuan. Of the species included in the above-given list, 81 are mentioned in Salvadori's work. Of the 24 new

species discovered by Mr. Forbes all are of Papuan genera, and nearly allied to known Papuan species except the *Strix*, which appears to be a diminutive form of an Australian type, and the *Myiagra*, which is nearest to a Timor form; the *Geocichla machiki* is most nearly allied to a Timor bird. There is also in the collection one other Timor bird, *Erythrura tricolor*, which is not found in New Guinea or the Moluccas. I think, therefore, we may fairly say that the Tenimberese Avifauna is pre-eminently Papuan, varied only by a slight element from Timor (represented by *Erythrura tricolor*, *Myiagra fulviventris*, and the *Geocichla*), and by an Australian tinge shown by the *Strix*, and perhaps by *Monarcha nitidus* being present (as in the Aru Islands) instead of *M. chalybeocephalus*.

SKETCH-MAP OF THE REGION, SHOWING THE GEOGRAPHICAL RELATIONS OF THE TENIMBER GROUP.
(WITH THE KIND PERMISSION OF THE COUNCIL OF THE ANTHROPOLOGICAL INSTITUTE.)

That the Tenimber group would possess a certain number of peculiar endemic forms was also to be expected, from their isolated situation, and the deep channel around them. Altogether these are 29 [now 30] in number, namely the 27 [28] species above described as new, and two Parrots (*Eos reticulata* and *Eclectus riedeli*) previously known." [H. O. F.]

IV.—*On the Collection of* Reptiles *and* Batrachians *from the Timor-laut Islands, formed by* Mr. H. O. Forbes. By G. A. Boulenger, F.Z.S.

(From Proc. Zool. Soc. London, June 5, 1883. Pl. XLI., XLII.)

The Reptiles and Batrachians collected by Mr. Forbes in the Timor-laut Islands, and presented to the British Museum by the British Association, belong to seventeen species, which, with the exception of two new to science, were already well known from different parts of the Austro-Malayan sub-region. The two new species are a Lizard of the Australian genus *Lophognathus*, Gray, and a Snake of the Indian genus

Simotes, D. & B. The latter is the most remarkable discovery, as no species of this genus was known to occur eastwards of Java.

The following is a list of the species collected :—

REPTILIA.

Lacertilia.

1. Gecko verticillatus, Laur.
2. Peripia mutilata (Wiegm.).
3. Varanus indicus (Daud.).
4. Ablepharus boutonii (Desj.) [*A. pœcilopleurus*, Wiegm.].
5. Euprepes rufescens (Shaw).
6. Euprepes cyanurus (Less.).
7. Lygosoma smaragdinum (Less).
8. Bronchocela moluccana (Less.).
9. Lophognathus maculilabris, Boul., sp. n.; P. Z. S. loc. sup. cit., Pl. XLI.

Snout obtuse, as long as the distance between the orbit and the posterior border of the ear. Nostril equally distant from the orbit and the tip of the snout. Upper surface of head covered with very strongly keeled scales. Dorsal scales small, the upper largest, strongly keeled, all obliquely directed upwards. Gular and ventral scales strongly keeled, the latter larger than the largest dorsal scales. No femoral or præanal pores. Upper surfaces olive, with blackish transverse markings across the back, tail, and limbs; upper surface of head with three obsolete blackish transverse bands, separated by light lines; a broad blackish band from orbit to tympanum, bordered inferiorly by a light band extending to above the fore limb; lips light-coloured, variegated with blackish; lower surfaces whitish, dotted all over with blackish.

Two specimens; the largest measures:—

	millim.
Total length	388
From tip of snout to vent	98
" " fore limb	43
Length of head (to occiput)	22
Width of head	17
Fore limb	46
Hind limb	94
Tail	299

Ophidia.

10. Python reticulatus (Schn.).
11. Liasis amethystinus (Schn.).
12. Enygrus carinatus (Schn.).
13. Simotes forbesi, Bouleng, n. sp.; P. Z. S. loc. sup. cit. Pl. XLII.

Length of snout measuring twice the diameter of the eye. Nasal divided; loreal slightly higher than broad; one præ- and two postoculars; temporals 1 + 2; seven upper labials, the third and fourth entering the orbit; four inferior labials in contact with anterior chinshields; latter, hinder part three-fifths the length of anterior pair. The portion of the rostral seen from above is as long as the suture between the internasals and the præfrontals; latter considerably higher than internasals. Frontal longer than its distance from the tip of the snout, as long as parietals. Scales in 17 rows. Ventrals slightly keeled on the sides, 155 or 165; anal entire; subcaudals 45. Upper surfaces greyish

brown, the borders of the scales darker; head with the ordinary symmetrical dark markings; the inner border of the seventh longitudinal series of scales, counted on each side from the gastrosteges, darker, thus forming two fine vertebral lines separated from each other by three rows of scales; belly yellowish, each ventral shield with a brown spot near the lateral edge, these spots more or less confluent into a dark streak, separated from the dorsal brown colour by a pure yellowish streak of equal width; in one of the two specimens the ventrals become gradually entirely brown towards the posterior part of the body, except the lateral outer streak, which remains pure yellowish. Head and body 30½ centim.; tail 58 millim.

14. DENDROPHIS PUNCTULATUS (Gray).
15. CHRYSOPELEA RHODOPLEURON (Reinw.).

ATRACHIA.

16. RANA PAPUA, Less.

V.—*On the* COLEOPTEROUS INSECTS *collected by* MR. H. O. FORBES *in the Timor-laut Islands.* By CHAS. O. WATERHOUSE, F.Z.S.

(From Proc. Zool. Soc. London, April 1884, p. 213, Pl. XVI.

The number of species of Coleoptera collected by Mr. Forbes in the Timor-laut Islands is twenty-nine. Of these the following deserve special notice on account of their geographical distribution:—

1st. *Diaphætes rugosus*, a new genus and species of Staphylinidæ, which Mr. David Sharpe informs me he possesses from Java.

2nd. *Cyphogastra angulicollis* (from Larat), a species of Buprestidæ, only previously known from Banda.

3rd. *Cyphogastra splendens* (from Maru), a new species closely allied to the preceding.

4th. *Archetypus rugosus*, a new species. This genus of Longicorns, of which there was only one species previously known, occurs in Waigiou, Dorey, and Aru.

5th. *Pelargoderus rugosus*. Another new Longicorn closely allied to *P. aruensis*.

6th. *Nemophas forbesii*. A third new Longicorn nearly allied to *N. grayi* from Amboina.

CARABIDÆ.

CATASCOPUS AMŒNUS, Chaud.

Two specimens which may perhaps be merely varieties of this species. They are, however, darker in colour than any in the British-Museum collection, being of an obscure olive-æneous, shading into dark purple at the sides of the elytra.

Hab. Maru.

STAPHYLINIDÆ.

DIAPHŒTES, Waterhouse.

General characters of *Staphylinus*, but with the smaller than is usual in that genus. Labial palpi robust, with three visible joints; the first and second short, the apical one very large and cup-shaped. The maxillæ

are very broad, the inner lobe a little longer than broad and densely covered with hair; the outer lobe produced a little beyond the inner one, the apex with dense matted hair, with four or five stiff bristles on the outer side. Basal joint of the maxillary palpi short; the second and third stout, about twice as long as broad, narrowed at the base: the apical joint narrower than the preceding, acuminate at the apex. The labrum about twice as long as broad, membranous, the middle of the front margin very deeply incised, fringed with stiff hair, and with some long stiff bristles arising from behind the margin. The anterior angles of the thorax are very much directed downwards and are rather obtuse, and are not visible when viewing the insect from above, in which position the thorax has a nearly circular outline. The under reflexed shining margins parallel as far as the front angles. Intermediate coxæ slightly separated. Tarsi rather slender.

DIAPHŒTES RUGOSUS, Waterhouse. P. Z. S. loc. sup. cit. Pl. XVI. Fig. 1.

Nearly black: sparingly clothed with pubescence, which is chiefly brown, but on the shoulders of the elytra, the basal segment of the abdomen, and the margin of the penultimate segment, and on the tibiæ is golden. Head, thorax, and elytra densely and very strongly punctured, the punctures on the disk of the thorax having a tendency to run together longitudinally. The punctuation of the abdomen is much less strong and less close. Head a little broader than long, about two thirds the width of the thorax; the cheek behind each eye is much less than the length of the eye, the posterior angle rounded. Thorax rounded at the sides and behind; in the middle of the base there is a short smooth spot. Elytra as long as the thorax, but distinctly broader, with an indication of a sutural stria. Legs pubescent, the middle tibiæ beset with small blackish spines on the outer side. Length 6 lines.

Hab. Larat.

PASSALIDÆ.

LEPTAULAX TIMORIENSIS, Perch.

The specimens in the British Museum Collection are from India, Philippine Is., Java, Amboina, Celebes, &c.

Hab. Larat.

DYNASTIDÆ.

ORYCTES RHINOCEROS, Linn.

Found in all the neighbouring islands.

Hab. Maru.

HORONOTUS DEILOPHUS, Sharp.

This species was described from the Philippine Islands. The specimens found by Mr. Forbes are small males, but do not differ materially from the Philippine examples.

Hab. Maru and Larat.

BUPRESTIDÆ.

CYPHOGASTRA ANGULICOLLIS, Deyr.

This species was described from Banda. The specimen before me from Larat agrees well with examples from Banda, but the copper colour on the suture of the elytra does not extend quite to the scutellum.

CYPHOGASTRA SPLENDENS, Waterhouse. P. Z. S. loc. sup. cit. Pl. XVI. Fig. 2.

Very close to *C. angulicollis*, and of the same form, but with a different

distribution of colour. The thorax is bright coppery, with more or less golden green on the disk. The elytra have the dorsal region very dark steel-blue (appearing almost black); this blue colour making an elongate triangular patch (common to both elytra), broadest at the base, and narrowing posteriorly terminates at about one-third from the apex; next there is on each elytron a broad oblique coppery red stripe (margined on its inner side by golden green), commencing on the shoulder, extending to near the apex (where it touches the suture), but then turned suddenly to the lateral margin of the elytron; the side of the elytron (from below the shoulder to where it meets the turn of the coppery stripe) is dark blue: the extreme apex is blue black. Length 17½ lines.

Hab. Maru.

Elateridæ.

Adelocera cincta, Candèze.

The specimen before me agrees well with the description given (C. R. Soc. Ent. Belg. 1878, p. lii) of this species from Sumatra. The allied species has a wide range.

Hab. Maru.

Bostrichidæ.

Bostrichus æqualis, Waterhouse. P. Z. S. loc. sup. cit. Pl. XVI. Fig. 3.

Elongate, parallel, convex, shining; black, with the elytra and legs obscure pitchy, antennæ paler. Head densely and finely granular; the epistoma less opaque, closely and finely punctured. Thorax with the basal half parallel, very convex; the front half obliquely narrowed anteriorly, sloping down, with six teeth on each margin, two anterior pair slightly porrect, the space between them emarginate. The surface posteriorly is marked with moderately large, deep punctures, which are irregularly placed, the intervals irregularly and extremely finely and rather sparingly punctured; all the front part is asperate. The posterior angles very slightly conically produced and diverging. Elytra of the same width as the thorax, scarcely broader posteriorly, very abruptly deflexed at the apex; deeply and strongly punctured, the punctures rather close together, placed irregularly near the suture, but having towards the sides a tendency to form lines; the interspaces smooth and shining, less than the diameter of the punctures (except here and there in the longitudinal direction, when the intervals are equal to the diameter of the punctures); at rather remote intervals very minute punctures may be seen. At the upper part of the posterior declivity, on each elytron, are two short, scarcely noticeable costæ; the extreme apex is slightly reflexed, dull. The first joint of the club of the antennæ is a little longer than broad, the second as long as broad, the third elongate-ovate. The anterior angles of the metasternum, and the metasternal epipleura are densely and very finely granular. The abdomen is closely and fine punctured, and very delicately pubescent. The tarsi are not very long as compared with some of the species of this genus. Length 5 lines.

Hab. Maru.

Tenebrionidæ.

Opatrum, sp.

A species closely resembling the African *O micans*, Germ., and perhaps identical and introduced.

Hab. Maru.

BRADYMERUS, sp.

A species of this difficult genus, which I am unable to determine.
Hab. Maru.

TOXICUM GAZELLA, Fabr.

The examples agree well with specimens of this species in the British Museum from Malacca.
Hab. Maru.

TOXICUM QUADRICORNE, Fabr.

The specimens in the British Museum are from Penang, Java, Philippine Is., and Borneo.
Hab. Maru.

AMARYGMUS, sp.

A single species of this very difficult genus, which I cannot determine.
Hab. Maru.

PEDIRIS SUBOPACUS, Waterhouse. P. Z. S. loc. sup. cit.

Closely allied to *P.* (*Nyctobates*) *sulciger*, Boisd., but less shining Entirely black; the head much more closely and rather more strongly punctured than in *P. sulciger*, especially on the vertex. Thorax slightly shining only in the middle: the impression on each side of the middle much less marked than in *P. sulciger*, the punctuation more distinct. Elytra somewhat dull; the striæ nearest to the suture very lightly impressed (except at the extreme apex); the lateral ones deeper, but much less so than in *P. sulciger*; the first three interstices flat, the lateral ones very slightly arched, much less than in *P. sulciger*.

Length 16 lines.
Hab. Maru.

CURCULIONIDÆ.

ORTHORRHINUS LÆTUS, Saund. & Jekel.

The type of this species is from New Hebrides.
Hab. Maru.

SPHENOPHORUS OBSCURUS, Boisd.

A widely distributed species.
Hab. Larat.

PRIONIDÆ.

ARCHETYPUS CASTANEUS, Waterhouse. P. Z. S. loc. sup. cit. Pl. XVI. Fig. 4.

Dark chestnut-brown, the head and mandibles inclined to black; the legs and abdomen pitchy yellow. Mandibles nearly as long as the head, very robust, convex, strongly punctured; on the inner side, and the epistoma clothed with fulvous hair. Head shining above, dull at the sides, with a longitudinal impressed line in the middle; with some strong punctures above, rugose at the sides. Thorax wider than the head; as its broadest part (just before the anterior angles) a little more than twice as broad as long, narrowed posteriorly, shining; the disk flat, moderately strongly but not closely punctured, with a smooth spot in the middle; the sides sloping down; the shining surface of the disk continued down the side in a triangular shape to near the margin; the rest of the side impressed, dull and densely punctured. Scutellum smooth. Elytra at the base a little broader than the base of the thorax, gradually widened posteriorly for two-thirds their length, and then again narrowed, the apex broad and obtusely rounded; shining, strongly and moderately closely punctured, except near the scutellum, where the punctuation is very delicate. Each elytron has a fine, slightly oblique raised line about the middle, commencing within the shoulder and not

extending to the apex. Submentum very closely and very coarsely rugose.

Length 16½ lines.

Hab. Maru.

CERAMBYCIDÆ.

PACHYDISSUS HOLOSERICEUS, Fabr.

Occurs in many of the neighbouring islands.

Hab. Maru.

DIATOMOCEPHALA BACHYMERUM, Pascoe.

The specimens of this species in the British Museum are from Celebes and Waigiou.

Hab. Larat.

LAMIIDÆ.

TMESISTERNUS GLAUCUS, Pascoe?

I am not sure of the identity of Mr. Forbes's specimen with the species described by Mr. Pascoe. It has more yellow colour on the abdomen.

Hab. Maru.

PELARGODERUS RUGOSUS, Waterhouse. P. Z. S. loc. sup. cit.

Nearly black; head coarsely rugose, with sandy yellow pubescence round and beneath the eyes. Basal joint of the antennæ very rugose, not much narrowed at its base. Thorax rugose, rather dull, with scarcely any trace of lateral spine, sparingly pubescent: the pubescence forming a narrow sandy line on each side of the middle. Elytra with the basal half rather strongly punctured, those at the base generally marked by a shining granule; the posterior half is more closely and more rugosely punctured. The basal half and the sides are rather closely marked with irregular small spots of sandy pubescence, but at about one quarter from the base there is near the suture an oblique bare patch. A little behind the middle there is a rather large oblique bare patch, which extends from the side to the suture; and behind this there is a patch of pale sandy pubescence, not quite touching the side, but reaching the suture and the apex. The apex of each elytron is obliquely truncate, the outer angle obtuse.

Length 18 lines.

Hab. Larat.

This species is very close to *P. arouensis*, Th., but is more robust, much more rugosely sculptured on the head and thorax; and the basal joint of the antennæ is less narrowed at the base and more rugose.

NEMOPHAS FORBESI, Waterhouse. P. Z. S. loc. sup. cit. Pl. XVI. Fig. 5.

Black, with the elytra bright steel-blue; the thorax entirely clothed with sandy yellow pile; the elytra with numerous more or less interrupted bands of reddish ochreous pubescence.

Length 17–20 lines.

This species is close to *N. grayii*, Pascoe, but has no trace of blue colour in the head and antennæ. The thorax is entirely covered with the yellow pile, with no black at the base. The bands of the elytra are more numerous, generally about seven, and these are more irregular. And lastly, the sterna, epimera, and the basal segments of the abdomen are more or less clothed with reddish pubescence.

Hab. Maru and Larat.

BATOCERA RUBUS, Fabr., var.?

The specimen from Larat is a little larger than *B. rubus* usually is, and has the scutellum clothed with fulvous instead of white pubescence.

COPTOPS FUSCA, Oliv.?

A single specimen from Maru which I cannot separate from the African *C. fusca* and which is therefore doubtless introduced.

SYMPHYLETES PEDICORNIS, Fabr.

An Australian species introduced.

Hab. Maru.

PRAONETHA PLEURICAUSTA, Pascoe.

I can see no difference between the specimen brought by Mr. Forbes and that described by Mr. Pascoe from Port Albany, N. Australia.

Hab. Maru.

CHRYSOMELIDÆ.

PHYLLOCHARIS CYANIPES, Fabr.

This species occurs in Australia, New Guinea, Buru, &c.

Hab. Maru.

V.—*On the* LEPIDOPTERA *collected by* MR. H. O. FORBES *in the Islands of Timor-laut.* By ARTHUR G. BUTLER F.L.S., F.Z.S., &c.

(From Proc. Zool. Soc. London, June 1883, Pl. XXXVIII.)

Twenty-three species of Lepidoptera were obtained by Mr. Forbes in his expedition to Timor-laut; one of these, however, is apparently a Micro-Lepidopteron, so much rubbed and broken as to be unrecogisable; all the Moths, in fact, are in very poor condition, forming a marked contrast in this respect to the Butterflies, which are well preserved.

The following Table will give an idea of the geographical relations of the named species in this collection:—

Species of Timor-laut.	Nearest allied species.	Typical locality of the latter.
Chanapa sacerdos.	Chanapa lewinii.	North Australia.
Calliploea visenda.	Calliploea hyems.	Timor.
Salatura laratensis.	Salatura artenice.	Java.
Hypolimnas forbesii	Hypolimnas polymena.	Aru.
Precis expansa.	Precis timorensis.	Timor.
Catochrysops patala.	Catochrysops patala.	Massuri.
Lampides ælianus.	Lampides ælianus.	East India.
Delias timorensis.	Delias timorensis.	Timor.
Terias maroensis.	Terias excavata.	Kangra.
Terias laratensis.	Terias lifuana.	Lifu.
Appias albina.	Appias albina.	Amboina.
Appias clementina.	Appias clementina.	Amboina.
Belenois consanguis.	Belenois pitys.	Timor.
Papilio aberrans.	Papilio liris.	Timor.
Papilio inopinatus.	Papilio adrastus.	Banda, New Guinea.
Diludia casuarinæ?	Diludia casuarinæ.	Sydney.
Ercheia dubia.	Ercheia dubia.	Rockhampton.
Lagoptera honesta.	Lagoptera honesta.	East Indies.
Lyssidia goldiei.	Lyssidia goldiei.	New Guinea.
Pinacia molybdænalis.	Pinacia molybdænalis.	Batavia.
Hymenia fascialis.	Hymenia fascialis.	Japan.

From the above, however, we may deduct the wide-ranging species *Catochrysops pa'ala*, *Lampides elianus*, *Lagoptera honesta*, and *Hymenia fascialis*, which leaves us 5 Timor types, 3 Australian, 2 Amboina, 2 New Guinea, 1 Aru, 1 Lifu, 2 Javan, 1 Indian. The last of these, however, is equally characteristic of the Malayan fauna, as also is that from Polynesia; these two forms, therefore, may be regarded as doubtful, which will leave the relative proportions of the species as follows:—Indo-Malayan 2, Austro-Malayan 10, Australian 3. The only surprising fact in this distribution is the preponderance of Timor over Aru or New-Guinea forms, the species characteristic of that island being only equalled by those from Aru, New-Guinea and Amboina combined.

Rhopalocera.

Nymphalidæ.

Euplœinæ.

1. Chanapa sacerdos, Butler; loc. sup. cit. Pl. XXXVIII. Fig. 7.

Nearly allied to *C. lewinii* of Australia; the wings much blacker, the primaries of the male velvet-black, the white spots on the primaries decidedly larger, the sericeous brand on the male of twice the length: secondaries with the discal series of white spots more regular, nearer to outer margin, and not notched as in *C. lewinii*; the submarginal spots clearer and arranged more regularly. Expanse of wings, ♂ 78 mm., ♀ 71 mm.

Larat.

2. Calliploea visenda, Butler; loc. sup. cit. Pl. XXXVIII. Fig. 1.

Allied to *C. hyems* (*arisbe*, Fld.) from Timor, but much darker; the primaries are of the male velvet-black; the white spots on the primaries larger, especially the two last in the series, the last of all being the largest spot in the series; submarginal dots wanting on the upper surface of primaries, but present on the secondaries, which are not bordered with pearl-white but with greyish brown; the discal spots forming a sinuous white band well separated from the margin, somewhat as in the preceding species; the usual whitish costa and cream-coloured sexual patch. Expanse of wings, 64 mm.

Maru Island.

This is one of the prettiest species in the genus, and is doubtless a copy of the preceding species.

3. Salatura laratensis, Butler; loc. sup. cit. Pl. XXXVIII. Fig. 5.

Allied to *S. artemice*, Cramer of Java; but the subapical white fascia decidedly broader; no central white markings on the secondaries; the veins on the under surface of these wings less distinctly bordered with white. Expanse of wings 70–74.

Larat.

Nymphalinæ.

4. Hypolimnas forbesii, Butler; loc. sup. cit. Pl. XXXVIII. Fig. 4.

♀. Allied to *H. polymena* from Aru: velvet-black shot with purple; primaries with the pattern of *H. velleda* ♀, but darker, and with all the white spots of double the size; the secondaries differ from *H. polymena* in having a series of hastate brown dashes along the internervular folds from just beyond the middle of the broad cream-coloured external area;

through the centre of which a series of white spots can be dimly seen. Expanse of wings 80 mm.

Larat.

This is one of the most beautiful species in the genus; it bears a vague resemblance to *H. albula* of Timor, which, however, belongs to the *H. anomala* group.

5. Precis expansa, Butler.

♂. Allied to *P. timorensis* of Wallace, from which, however, it differs in its clearer fulvous colouring above, the blackish colouring of the external area being confined to the apex, the paler coloration of the under surface, its broader and less produced primaries, and the less pronounced caudal angle to the secondaries. Wings above tawny, with black markings and bluish-centred ocelli, as in *P. erigone* of Java (Cramer, Pap. Exot. i. pl. 62. E, F), but the white markings of that species replaced by a slightly paler tint of tawny than the ground colour; under surface as in *P. erigone*. Expanse of wings 52–54 mm.

Larat.

Why the *P. erigone* group has been referred to *Junonia* and the scarcely differing *P. natalica* to *Precis* it would, I think, be hard to explain. *P. antigone* and *P. natalica* seem very closely allied species.

Lycænidæ.

6. Catochrysops pfatala.

Lycæna patala, Kollar, Hügel's Kaschmir, iv. 2, p. 419 (1848).

♂. Maru Island.

Does not differ from Indian specimens excepting in the slightly whiter tint of the under surface.

7. Lampides ælianus.

Hesperia ælianus, Fabricius, Ent. Syst. iii. 1, p. 280. n. 79 (1793)

Larat.

Does not differ from Indian specimens excepting in its slightly inferior expanse of wings; in colouring and pattern it perfectly agrees.

Papilionidæ.

Pierinæ.

8. Delias timorensis, Boisduval; loc. sup. cit. Pl. XXXVIII. Fig. 6.

Pieris timorensis, Boisduval, Sp. Gén. Lép. i. p. 459. n. 30 (1836).

Larat.

Most nearly allied to *D. vishnu* of Moore from Java (with which species it was associated by Wallace). It differs in its superior size, the narrower black area of the upper surface, the deeply sinuated inner edge of the black area on the primaries, the apical series of spots much smaller, the fifth, as Boisduval says, "très petite et ponctiforme," whereas in *D. vishnu* this is the case with a sixth spot not present in *D. timorensis*: primaries below with the basal pale area cuneiform (not angular), pure lemon-yellow within and just below the cell, otherwise pearl-white ("la base gris-blanchâtre saupoudrée de jaune pur," *Boisd.*): secondaries with only the basi-abdominal third* brilliant golden yellow; suffused at

* The carelessness of Boisduval's description at this point probably misled Wallace; he says:—"La moitié antérieure d'un beau jaune de chrome." On the other hand, the yellow of *D. vishnu* has a decidedly dull creamy appearance.

its inferior extremity with bright orange; the inner edge of this area straight, not angulated as in *D. vishnu*; the submarginal red lunules narrower, of a more carmine tint, the terminal one not expanded, further from the outer margin, yet not touching the yellow area: there are in fact, as Boisduval says, "sept lunules," and not six lunules and two spots as in *D. vishnu*.

9. Terias maroensis, Butler; loc. sup. cit. Pl. XXXVIII. Fig. 2.

♀. Nearly allied to *T. excavata* of Moore, from India, but of a decidedly deeper yellow (bright sulphur) than the female of that species: the inner edge of the external border decidedly arched, convex, not concave, towards the costa, the situation upon the median interspaces not so deep and more oblique (as in *T. sari*); the discal markings on the under surface of secondaries less defined and arranged in a much less irregular series. Expanse of wings 42 mm.

Maru Island.

10. Terias laratensis, Butler; loc. sup. cit. Pl. XXXVIII. Fig. 3.

♂. Nearly allied to *T. lifuana*; above most like my "Japanese *Terias*," fig. 10 (Trans. Ent. Soc. 1880, pl. vi.), but with less-pointed primaries and narrower apical border; it, however, belongs to the *T. æsiope* group, the primaries below being marked with a curved series of three subapical red-brown spots; other markings much as usual, all well defined; the discal series of secondaries forming a nearly straight line between the first subcostal and second median branches. Expanse of wings 39 mm.

Larat.

11. Appias albina.

Pieris albina, Boisduval, Sp. Gén. Lép. i. p. 480, n. 62 (1836).

♂. Maru Island.

A small example; the species was originally described as from Amboina.

12. Appias clementina, Feld.

Pieris clementina, Felder, Sitzungsb. Ak. Wiss. Wien, math.-nat. Cl. xl. p. 448 (1860); Reise der Nov., Lep. ii. p. 162, n. 133, pl. 25. Fig. 6 (1867).

♂. Maru Island.

Originally described as from Amboina.

13. Belenois consanguis, Butler, loc. sup. cit.

Nearly allied to *B. pitys* from Timor, but a little smaller; the external border of primaries with more oblique inner edge, much broader towards the costa and without any trace of a subapical white spot: primaries below white, suffused with sulphur-yellow at the base only; external area black internally, but of a reddish clay-colour towards apex; its inner edge much less irregular than in *B. pitys*, being situated only on the lower radial and lower (or first) median interspaces: secondaries saffron-yellow, the external border with purplish-black internal, and reddish clay-coloured external half. Expanse of wings 48 mm.

Larat.

Papilioninæ.

14. Papilio aberrans, Butler, loc. sup. cit.

Pattern and form of *Papilio liris* of Timor, which it greatly resembles on the upper surface, but the pale area on the primaries is whiter, and

the submarginal spots on the secondaries sandy brown, instead of dull red; the sides of the abdomen, front of head, anus, and lateral pectoral stripe are ochreous instead of deep rose-red, and the submarginal spots on the under surface of the secondaries are ochreous buff instead of rose-red. Expanse of wings 108 mm

♂ ♀. Larat.

There were several examples of this species in Mr. Forbes's collection, clearly showing that the differences of coloration are constant.

15. Papilio inopinatus, Butler, loc. sup. cit.

Allied to *P. adrastus* of Felder, from Ceram and N. Guinea; but the male with a broad oblique subapical white belt, which does not quite reach the outer margin and is cut by the black nervures; the fascia on the secondaries narrower, formed more nearly as in the Australian *P. ageus*, with zigzag outer edge, but of more uniform width throughout than in that species, and of a sordid cream-colour; a scarlet spot near the anal angle, well separated from the central fascia. The female differs in the whiter and oblique belt across the primaries, the inner edge of which is not so deeply zigzag, and therefore is not angulated as in the allied species, and the outer half towards apex suffused with grey so as greatly to reduce its width; secondaries with no trace of the central white patch, the submarginal scarlet spot large, oblong, and notched in front. Expanse of wings, ♂ 144 mm., ♀ 153 mm.

♂ var. Wings shorter; the inner edge of the white band of primaries impinged upon by the discoidal cell, which also encloses a spot of the same colour as the band; the band of the secondaries broader, cutting across the end of the cell. Expanse of wings 132 mm.

Maru Island.

Heterocera.

Sphingidæ.

16. Diludia casuarinæ? Walk.

Macrosila casuarinæ, Walker, Lep. Het. viii. p. 210, n. 19 (1856).

Larat. Taken in Sagueir (palm-wine) bamboos.

The specimen is so much rubbed that it is impossible to be sure that it is the same as the Australian species.

Catephiidæ.

17. Erchiia dubia, Butler.

Catephia dubia, Butler, Cist. Ent. i. p. 292 (1874).

Larat.

One worn example of this Australian species was obtained.

Ophiusidæ.

18. Lagoptera honesta, Hüb.

Thyas honesta, Hübner, Samml. exot. Schmett. ii. Lep. iv., Noct. iii. Semigeometræ v., Meropides A. Festivæ 1, figs. 1, 2 (1805).

♀. Larat.

Uraniidæ.

19. Lyssidia goldiei, Druce.

Lyssidia goldiei, Druce, P. Z. S. 1882, p. 781.

Larat.

HYPÆNIDÆ.

20. PINACIA MOLYBDÆNALIS, Hüb.

Pinacia molybdænalis, Hübner. Samml. exot. Schmett., Zutr. p. 13, n. 218, figs. 435, 436.

Larat.

Previously known from Java and Borneo.

ASOPIDÆ.

21. HYMENIA FASCIALIS, Cram.

Phalana-Pyralis fascialis, Cramer, Pap. Exot. iv. pl. 398. O (1782).

Larat.

A fragment of this wide-ranging species was obtained.

BOTIDIDÆ.

22. BOTYS, sp.

A broken example of a species allied to *B. gastralis*, which it resembles in size and coloration; the pattern, however, agrees better with *B. rosinalis*.

Ritabel, Larat.

The specimen is not sufficiently perfect to name; it is chiefly interesting for its resemblance to New-World types.

The only other Lepidopteron is unrecognisable, as previously mentioned; the veining of the wings reminds one of some Micro-Lepidopteron.

VII.—*On the Collection of* HYMENOPTERA *and* DIPTERA *from the Timor-laut Islands, formed by* MR. H. O. FORBES. By W. F. KIRBY, Assistant in the Zoological Department, British Museum.

(From the Proc. Zool. Soc. London, May, 1883, p. 343 et seqq.)

The small collection before me, consisting of only five species of Hymenoptera (all new) and three of Diptera, was formed in two of the smaller islands of the Timor-laut group, viz. Larat and Maru. I will now proceed to describe the Hymenoptera and to notice the Diptera, merely remarking that they exhibit strong affinities to those of the surrounding groups of islands, as would naturally be anticipated beforehand. The specimens are numbered; and I have noted these numbers throughout.

HYMENOPTERA ACULEATA.

APIDÆ.

CROCISA CÆRULEIFRONS, Kirby., loc. cit.

Long. corp. 5 lin.

Female. Black, face and orbits (very broadly above) blue; prothorax with a short stripe behind on each side above, and a very large spot on the sides; mesothorax with seven blue spots—two small ones on the front border, adjoining those on the prothorax, a longitudinal one between, then two slightly oval ones near the middle, and a large irregular spot behind on each side, projecting a branch forward within the very large black tegulæ; scuttellum black, strongly excavated in the middle: abdomen with the first segment blue, a narrow longitudinal line, the greater part of the hind border, and a long transverse spot contiguous to

it black, the remaining segments of the abdomen are black, with a wide blue stripe sloping slightly upwards on each side; legs black, all the tibiæ with a wide blue stripe on the outside; wings dark purplish brown. (2128, Maru.)

Allied to *C. nitidula*, Fabr., a species common in Amboina, Australia, &c., but apparently distinct.

XYLOCOPA FORBESII, Kirby, loc. cit.

Long. corp. 10 lin.

Male. Thickly clothed above with olive-green pubescence, as in the male of *X. æstuans*, Linn., or of *X. bryorum*, Fabr.; antennæ black above and fulvous beneath, the hairs on the middle of the under surface of the body, especially towards the tip, those on the lower part of the face, and the very long hairs on the tarsi shading into fulvo-ferruginous: wings brownish hyaline, with a slight violet shade, and marked on all the cells along the hind margin with numerous black dots, as in the allied species: proboscis black, probably reddish within and at the base when extended. (1988, Larat.)

Female. Black, thickly clothed with black hairs, and very thickly and finely punctured, except on the middle of the mesothorax, which is smooth and shining, and has a short longitudinal furrow in front; head clothed with bright yellow pubescence, that on the face thinner and paler; wings with a bright green iridescence, purplish along the veins towards the base; apical half of the antennæ pale beneath; proboscis mostly reddish; under surface of body thickly punctured, but with some bare spaces along the middle line. (1958, Larat; 2019, Maru.)

Closely allied to *X. coronata*, Smith, from Kaioa; but in the female of that species (which doubtless has a male similar to that of *X. forbesii*) the wings have a bright violet instead of a green iridescence.

VESPIDÆ.

POLISTES EXTRANEUS, Kirby, loc. cit.

Long. corp. 5 lin.

Female. Head and thorax bright chestnut, clypeus pentagonal, bright yellow; mandibles with a yellow mark on each side: antennæ dull yellow; the scape, second joint, and upper part of the third reddish; prothorax narrowly edged with yellow in front and behind: scutellum with a transverse yellow line; metathorax edged with yellow on the sides; abdomen with the first joint yellow, with a broad red stripe, bordered behind with black, extending for two-thirds of its length above, second and third segments blackish brown, the third bordered with yellow behind, the fourth yellow bordered with blackish brown in front and behind, and the fifth and sixth dull reddish; wings brownish hyaline, with reddish-brown nervures, yellow stigma, and brown borders. (2025, Maru.)

Closely allied to *P. stigma*, Fabr. from India, Ceram, and Celebes.

SCOLIIDÆ.

DIELIS LARATENSIS, Kirby, loc. cit.

Long. corp. 10½ lin.

Female. Black; sides of thorax and abdomen, and legs clothed with black hair; face black; clypeus very finely punctured above, and more coarsely on its lower edge, and bordered at the sides and below with yellow pubescence; mandibles pitchy; thorax and abdomen finely punctured, much more densely than elsewhere on the sides of the abdo-

men and on the four terminal segments, both above and below: thorax and abdomen with strong steel-blue reflexions, especially on the basal

DIELIS LARATENSIS. (With the permission of the council of the Zoological Society.)

half of the abdomen above; wings deep violet-brown, second recurrent nervure incomplete, diverging from the first at the base and on the left wing; the nervule connecting the recurrent nervures above the middle is also obsolete. (1957, Larat.)

Much resembles the Australian *Trichis anthracina*, Burm., in appearance.

Chrysididæ.

Chrysis melanops, Kirby, loc. sup. cit.

Long. corp. 5 lin.

Male. Bright green, with a coppery reflection on the head and thorax (very bright coppery red wherever abraded); punctures large, close together, but not confluent; ocelli black, the space between and immediately around also blackish; apex of abdomen (and summit, when viewed sideways) with a strong blue reflection; under surface of antennæ, the greater part of the hind legs, and the tips and under surface of the middle tibiæ and middle tarsi brown; abdomen sexdentate, with equal and rather pointed teeth of moderate size; wings brown. (2019, Maru.)

Probably allied to *C. parallela*, Brullé, from Timor; but that species is varied with blue on the head and thorax, instead of with copper.

Diptera.

The only Diptera in the collection were *Plecia fulvicollis*, Wied., and *Laphria gloriosa*, Walk., both of which are common species in the Eastern Archipelago, and a *Tabanus*, possibly new, but in too bad condition to describe.

VIII.—*List of the* Crustacea *collected in the Timor-laut Islands by* Mr. H. O. Forbes. Determined by E. J. Miers, F.Z.S.

Pilumnus vespertilio, Fabr. ad. ♀.
Neptunus pelagicus, Linn.
Thalamita crenata, Rüppell, ad. ♀.

Ocypoda ceratophthalma, Pallas, ad. ♂.
Gelasmius vocans, Linn. ad. ♂.
„ tetragonon, Herbst, ad. ♂.
„ annulipes, M. Edw. ad. ♂.
Macrophthalmus pacificus, Dana, var.
Grapsus strigosus, Herbst, ad. ♂.
Pachygrapsus oceanicus, var. quadridentatus, Stimpson.
Cardisoma carnifex, Herbst, ad. ♂.
Myctiris longicarpus, Latr., ad. ♂.
Cœnobita rugosa, M. Edwards, ad. ♂.
Stenopus hispidus, Olivier, ad.
Pseudosquilla ciliata, Fabr. ad.

IX.—*Vocabulary of Words used in the Ké Islands and in Ritabel, Larat, Timor-laut Islands.* Compiled by the Author.

Vocabulary.	Ké Islands.	Timor-laut (*Larat*).
Anchor	.. .. ..	Vatu.
Anchor, cord	.. .. ..	Warat.
Anklets	.. .. ..	Riti.
Ant	Kirkim	
Arm	Arumud	Vetit, wholearm, Alaad.
Arm, fore	.. .. ..	Tanuvur.
Armlet of shell	.. .. ..	Sistōh.
Armlet of ivory	.. .. ..	Lela.
Ashes	Knabun	
Bad	Sisian	Sian.
Bamboo	Temar	Temar.
Banana	Müu	Mou.
Bat	.. .. ..	Yabar.
Batatas (sweet potato)	.. .. ..	Ena.
Bathe	Suruk	Titluruita; Faliru.
Beads	.. .. ..	Marumut.
Bed	Rin	Taïta.
Belly	Eboon	Evoon.
Belt, of sheath of *Borassus* ..	.. .. ..	Calco gnaman,
Belt, woman's	.. .. ..	Calco.
Beautiful (view)	Labuang	
Bird	Manoot	
Black	Metmétan	Ngtoan; akuda.
Blood	Lara	Lara.
Blood-vessel	.. .. ..	Urat-vali.
Blue	Timtum	Nitlali.
Boat	Habo	Ra; hor.
Body	Uling	
Bone	Lurin	Lorin.
Bow	Temar	
Box	Sungoh	
Boy	Koot-Koot	Kosoku.
Breast, male and female	Bubur: Scos ..	Bubu: Susu.
Bring	.. .. ..	Mleba.
Butterfly	.. .. ..	Aikuan.
Cage	.. .. ..	Rahankau.
Calabash, for eating out of ..	.. .. ..	Phenga.

Vocabulary.	Ké Islands.	Timor-laut (*Larat*).
Chain, girdle worn by women ..	.. .. ..	Eboor.
„ cord part of it	.. .. ..	Erit.
„ button for fastening ..	.. .. ..	Erit-matan.
Chalk	.. .. ..	Yafoor.
Child, male; female	Yanad	Kosoku-vata; yanad.
Chief (of the people)	.. .. ..	Tamatmela.
Chin	.. .. ..	Demid.
Chopper	Gnir	
Clouds	.. .. ..	Mutan.
Coat	... .	Ravit.
Cocoa-nut; young (1); old (2) ..	Gnoor	Gnoor; gnoor-vua (1); gnoor-ka (2).
Cold	Tabrinin	Ridiria.
Comb	.. .. ..	Ooal.
„ decorated	.. .. ..	Ooal lela.
Come	Modo	
Cradle	Wel-wel	Siwèla.
Dance	.. .. ..	Tabar; amtabar.
Dance song	.. .. ..	Tjikelele.
Daughter	Yanad vat vat ..	Yana ma vata.
Day	Hamar	
Deity	Dooad	Dooadilah.
Doll	.. .. ..	Taran.
Door	Fid	Inooan.
Ear	Aroon	Arood.
Earrings (of gold; earrings of dugong)	.. .. ..	Lor-lora; welwelak (of *Halicore* tooth).
Earth	.. .. ..	Elanoo.
East	.. .. ..	Timor; mololan.
Eat	Täan	Mame; Tufnān.
Eclipse	.. .. ..	Karasok faria.
Eggs	.. .. ..	Mata-téloor.
Evening	.. .. ..	Lerivava.
Exchange	Tetivook	Heloo.
Eye	.. .. ..	Mata.
Eyebrows	Mataidroon	Mata-toovin.
Face	Mahad	Wahad.
Far	.. .. ..	Rorō.
Father	Yamain	Yaman.
Fathom	Ref	Erēfa.
Feather	Manvoon	
Female	.. .. ..	Vata.
Finished	Enrok	Rokiöok.
Fire	Yaf	Yafoo.
Fish (1), to fish (2)	Ian (1)	Woowoot (1), Ian (1), dawa woot (2).
Flesh	Hin	Wawoo.
Flower	.. .. ..	Ofuoon.
Fly	Raboor	
Foot	.. .. ..	Lang.
Forget	Oobloofang	Kablufan.
Fowl	Manoot	Manoot.
Friend*	Ningyan	Kidang.
Fruit	Booal	
Give	.. .. ..	Malabokoo-ria.

* In Yamgena (mainland) friend is *Kes*. "Friend, I am going,"—"Kes Kamtia lo.

Vocabulary	Ké Islands.	Timor-laut (*Larat*).
Go	Elbooa	
Gold	Mas	Mas.
Good	Böök	Lolin.
Great	.. .. ..	Dawon.
Gum	.. .. ..	Natal.
Hair	Mooroot	Wuoot.
Half	.. .. ..	Tera.
Hand	Limad	Limad tanan.
Hard	Oosin	Nangrebat.
Harpoon	.. .. ..	Teär.
Head	Ool	Oolood-watool.
Hear	Mdenar	
Heel	.. .. ..	Ratawoo.
Here	Odani	Haworokia.
Honey	Wenan	
Horns (of house)	.. .. .	Kora.
Hot	Naneh	Nanganeh.
House	Rahan	Rahan.
How many	Hongakbe	Efira.
Husband	Brinran	Hawan.
Indian corn	.. .. ..	Selaroo.
Iron	Tman	
Island	Nuhoo yaret ..	
Knee	Ead toor	Toorad.
Knife (1) sheath (2)	Gnib	Enkō, akooda.
Know don't	.. .. ..	Wolemgka.
Kris	.. .. ..	Sariba.
Large	.. .. ..	Dawon.
Leaf	Roan	
Leg	Eäng (man's own leg), cäm (another's)	Eäd.
Lightning	.. .. ..	Fitik.
Little	Rööt	
Loincloth	.. .. ..	Ro-ok { blue and white, Hemenmaran. / blue, Hemen antoan. / white, Hemen buru.
Long	Bloöt	Blawat.
Lorie	. .. ..	Leloor.
Louse	Oot	
Male	.. .. ..	Trama.
Man	Tomata	Tomata.
Man, young	.. .. ..	Ververum.
„ married	.. .. ..	Etrama.
Manioc	.. .. ..	Tooal.
Many	Abed	Leher.
Marry	Tafan	Sefa.
Mat	Dar	
Monkey	Buoo	
Moon	Ooan	Voolan.
Morning	.. .. ..	Ververa.
Mosquito	Emimoos	
Mother	Nen	Titi.
Mouth	Guen	Soomar.
Mail	Kukud	

Vocabulary.	Ké Islands.	Timor-laut (*Larat*)
Nail, finger	Kukud	
Navel	.. .. ..	Fooart.
Neck	.. .. ..	Relad.
Needle	Boolin	
Night	Dedan	
No, simple negative	Waid	Walafa; wah.
No, refusal of anything	Naä	Nafena.
Noon	.. .. ..	Lera si lola.
North	Madmar	Mormar.
Nose	Niroon	Niroot.
Oil	Gno	
Orchid	.. .. ..	Wookoo.
Pig	Babi	Bab.
Pillow	.. .. ..	Loolooni.
Poison	.. .. ..	Elaän.
Post	Fler	
Rain (1); it rains (2)	Doöt (1)	Doöt (1); dcöt oofiri-roo (2).
Rat	Karoo	Manhowan.
Rattan	Oo	Oo.
Red	Voolvooli	Noovooli.
Remember (1); remember well (2)	Oofang nangken ..	Ninana (1); masilolin (2).
Resin	.. .. ..	Natal.
Reticulum (of palm)	.. .. ..	Nafit.
Rice	Kokat	Wanan.
River	Hoat	Noar.
Road (path)	Ood	
Root	Waär	
Sagueir (palm wine)	Tooat	Tooak.
„ Bamboo for holding ..	.. .. ..	Ravivit.
Salt	Masin	Sirak.
Sand	Gnwoor	Gntoor.
Say; what do you say?	Onalaka	
Sea	Laut	Meti; tahat; haletan.
See	Mlik	Misilik.
Sell	Oomfed	Fedi.
Send	.. .. ..	Nigaän ngnoo.
Sew	Mhoar	
Shell	.. .. ..	Mahan.
Shell, great clam (*Tridacna*) ..	.. .. ..	Mahan.
Shield	Lèr	Salawakcon (long). Gnelia (short).
Silver	Rubi	Mas ninoor.
Siri (1); basket for siri (2) ..	Maneran	Naän (1); loovoo
Skin	Ulid	
Sky	.. .. ..	Lanit.
Sleep	Tatoob	Tooba.
Sleeping-mat	.. .. ..	Elari bangkoko.
Small	.. .. ..	Koko.
Smoke	Yafmahum	Yafuman.
Snake	Rubai	Nifa.
Son	.. .. ..	Yana ma brana
Sour	Kahir	Kabi.
South	Tranan	Trana.
Speak	Tangrihi	Tangrihi (guttural).
Spear	Nangah	Boonoot.
Spoon	.. .. ..	Ooroo.

Vocabulary.	Ké Islands.	Timor-laut (*Larat*).
Star	Nar	Narra.
Suckle	.. .. ..	Toi masoosoo
Sugar-cane	.. .. ..	Tevoo.
Sun	.. .. ..	Lera.
Sweet	Kaslooir	Minaminat.
Tattooing	.. .. ..	Belbela.
Teeth	.. .. ..	Nifat; nifa rida.
Testicles	.. .. ..	Kamad.
There (to)	.. .. ..	Tatin-heri.
Thatch	.. .. ..	Rafat.
Thread, thread of which native sarongs are made	Kar	Avat; alōän.
Thumb	.. .. ..	Limad keteh.
Thunder	Nafdud	Dodong.
Tibia, tuberosity of	.. .. ..	Gnangōi.
Ties, made of sugar-palm ..	.. .. ..	Eira.
Toe, great	.. .. ..	Eäd tanan keteh.
Toe, second (1); little toe (2) ..	.. .. ..	Eäd tanan frooan (1); frooan kewaren (2).
Toe-nail	.. .. ..	Eäd uoon.
Toe ring	.. .. ..	Sitanea.
To-day	.. .. ..	Lervava.
To-morrow	Meran	Vera-vera.
Tongue	.. .. ..	Eard.
Trousers	.. .. ..	(?) Kada.
Understand	Okai	Fanowak.
Very; very beautiful	.. .. ..	Roäk; lolin roäk.
Wake	Batai	
Wash	Burik	(?) Wangir.
Wash, hands	.. .. ..	Tifiaru trame.
Wash, teeth	.. .. ..	Tonumur.
Water	Wehr	Ooër.
Waves (1); large waves (2) ..	Voo-vooat (1) ..	Saksahan (1); lalawa (2).
Wax	Lilin	
Weep	Mroon	Fakar.
West	.. .. ..	Warat mololan.
White	Nangear	Nangear.
Wife	Hoöd	
Wind	Nioot	Nëet; lar.
Window	.. .. ..	Yanella.
Wing	Halaän	Halaän.
Wire	Bilbal	Ververi.
Wish	Rangen	Inan roh.
Woman	Vat-vat	Vata; mnilat.
Wood	Ai	Saifa.
Work	.. .. ..	Tootwafa.
Yellow	Toomtoom	

Numerals :—

1 = esã.	8 = ewaloo.	50 = ootlima.
2 = eroo.	9 = esi.	60 = ootnean.
3 = eteloo.	10 = esapuloo.	70 = ootfitoo.
4 = efät	20 = ootrooa.	80 = ootwaloo.
5 = elima.	30 = eteteloo.	90 = ootsi.
6 = enean.	40 = ootfaät.	100 = ratoo.
7 = efitoo.		

PART V.

IN THE ISLAND OF BURU.

CHAPTER I.

FROM KAJELI TO THE LAKE.

From Amboina to Buru—Kajeli—Trade of Kajeli—Birds—River Apu—Wai Blöi village—Village of Wai Gelan—The Matakau—Forced encampments—Wai Klaba—A Pomalied mountain—Wasilale—Hospitable reception—Houses—Musical performance—Pomali signs—Arrive at Laha.

HAVING packed up and despatched my Timor-laut collections to Europe, I left Amboina on the afternoon of the 7th of November (A—— remaining behind with our kind hosts) for Buru, an island a short distance to the west, with the intention of reaching the central region round the rarely visited Lake of Wakolo. Next morning at daybreak we were steaming under the shade of the "Mother and Daughter" mountains of the Dutch maps, whose picturesquely rugged peaks, standing out against the sky like giant minster towers, mark the eastern promontory of the Bay of Kajeli, in whose southern bend lies the town of the same name, where I landed in the forenoon, and was kindly offered a room in the house of Post-holder Bergmann.

The town is situated on a low morassy plain, which, during the rainy season, is often wholly inundated, and has the reputation of being very unhealthy, the people being afflicted with malarial and rheumatic fevers, and I am told also with sterility. Its most conspicuous edifice is the Fort, enclosed in massive embrasured walls erected in 1778 by the Dutch close to the shore, to protect the Bay from the pirate hordes who used to make Buru their special slave-kidnapping ground. There is now, however, a distance of from seven hundred to eight hundred yards of a tall grass covered sandy flat separating it from the margin of the water, which has been gained from the sea in little over 100 years.

Its great items of export are fish (which, during the latter months of the year are driven into the Bay in enormous

quantities), sago, and the famous Kajuput oil,* distilled by the natives from the leaves of the gum trees (*Melaleuca Kajuputi*) which form a large part of the vegetation of the shores of the Bay. In the year previous to my visit 96,000 bottles, worth £9,200, were shipped for Macassar, Singapore, and China. From Masaretti, one of the villages in the south coast, a large trade is done with Amboina in Katjang beans (*Arachis hypogæa*), in Hotjong (*Eleusine coracana*), and in pigs, in exchange for copper gongs, in whose music the natives greatly delight. These pigs, brought from the mountainous parts of the interior, having been fed on sago, which gives their flesh a specially fine flavour, fetch a higher price in the market than any other.

The island is divided into rajah-ships, whose rajahs reside in Kajeli and spend most of their time under the influence of opium.

One of the chief points of interest to me in Buru, was the fact that it has been considered—not on any very certain data—as the starting-point of the final dispersion of the autochthenes of the archipelago, the Mahori (or Polynesian) races,† eastward to their Pacific homes. As between the coast tribes and the Aléfurus of the interior, who, according to their own superstitions "durst not approach the sea so near as to hear it breaking on the shore without being struck with dire sickness," there has never been much inter-communication, I was very anxious to see these little contaminated people of the interior.

I was disappointed, however, to find that my official letters for aid were useless without "instructions" from the Resident (I had applied officially for them to Mr. Riedel, but he abstained from taking any notice of my letter), the Post-holder was not at liberty to assist me in obtaining porters or other transport to the lake; but as he was himself very soon to go there officially, he would be very pleased, he said, if I would accompany him. As it was impossible for me to obtain the necessary transport except through the rajahs at the instance of the Post-holder, I was glad on any terms of the chance

* This is the Dutch spelling of the Malay Kayu = wood or tree, puti = white, from the colour of the bark of the tree.

† Consult Stanford's *Compendium of Geography*, Australasia, app., p. 612.

of penetrating into this interesting island. Meanwhile I employed myself in collecting round Kajeli, where I obtained many of the species of birds discovered there by Mr. Wallace, and described by him in the "Proceedings of the Zoological Society" for 1863, among them the interesting oriole (*Oriolus buruensis*) and the honey bird (*Philemon moluccensis*) which it mimics, both closely resembling the corresponding species shot in Larat, as well as the pretty Kajeli kingfisher (*Ceyx cajeli*), the *Aprosmictus buruensis*, and the rare *Eclectus intermedius*.

On the 14th we started for our first stage towards the Lake, the village of Wai Blöi (where we were to find our transport men waiting us), accompanied by the Rajah of Kajeli, in whose district the Lake lies, and the Pati of Lisela through a portion of whose territory we had to pass. The way to Wai (river) Blöi, the first village beyond the morass land fringing the shore, lay up the river Wai Apu, which debouches in the centre of the Kajeli Bay, an hour's sail from the town.

The river near its embouchure splits into many arms among the mangrove swamps, then winds for hours through low morass between banks green with fern-hedges dipping their fronds into the sluggish water under the shade of tall slender trees. Higher up these gave place to Pandan thickets out of which rose tall Lontar-, Pinang-, and wild sago- (*Metroxylon filare*) palms, and graceful tree ferns. Where the banks were less submerged the jungle became very dense behind a thick barrier of Mangabrabu in profuse flower (*Cerbera odallam* and *C. lactaria*) Apocynaceous shrubs, which lined the river sides for miles, and dotted the water with their white blossoms. Out of this thicket an occasional black cuckoo (*Eudynamis ransomi*) flew out as we passed, while on the taller trees whose heads shot up above the jungle sat many white Nutmeg-pigeons (*Myristicivora melanura*) and here and there a red-necked hawk (*Accipiter rubricollis*).

After four hours of hard rowing, the blue hills shot up right ahead and broke the gloom of the monotonous vegetation which had bounded our view, and between which, throughout the rest of the hot afternoon, our prau was now slowly dragged through frequent rapids, now laboriously poled upwards against the swiftening stream. Baked in our cramped position in the narrow boat, the journey would

have been almost unbearable, but for the frequent flash of insect—bright Papilios and Ornithopteras—and of bird—the orange Pachycephalas, the yellow White-eyes (*Zosterops*), lazily flapping Herons, and the blue-plumaged scarlet-billed Water-hens (*Porphyrio melanopterus*)—which darted to and fro across the stream.

At dark, in the midst of a heavy rain, we reach the confluence of the Wai Blöi, about 200 feet above the sea, where several Aléfurus—the name by which all the natives of the interior I met call themselves—were waiting to carry us on suspended chairs to the village about a mile distant. The Aléfurus can scarcely be said to inhabit villages; they live more frequently in isolated houses on the patch of land they cultivate or in small communities. Those, however, within certain regions denominated *Soas* seem to have claims on each other of consanguinity or friendship; as if the members of a large village had dispersed, and, while living separately, still recognised all the former ties in times of difficulty or war. Each Soa has its chief, and *Merinyo* or under chief, who is responsible to *Porterus*, officials who receive in the name of the rajah the tribute of their gardens and fields as well as compel them to give their produce, in exchange for coast goods at an exorbitant profit.

Next day we took a westward course through fields of tall Kussu grass dotted with Kayu-puti trees, and through swamps full of sago palms. At early forenoon we rested for a little at the village cluster of the River Gelan, one of the tributaries of the River Apu. Overarching the path was an open shed with benches along each side on which we reclined, serving possibly as a general meeting room or rest-house for passers corresponding to the *Balai* of Sumatra, or the *Baluai* of Amboina. When we arrived we found a sleeping child tied in a blanket swaying to and fro at the end of a rope hung from the rafters. It had been thus left to be rocked and nursed by the wind, till its mother returned from the fields! As soon as a traveller arrived I noticed that he was at once waited on by the women of the village who brought siri, betel and chalk, and a hot ember to light his cigarette. The women seemed to live in great subjection to the men, who never did anything for themselves if a woman was within call.

Their houses were of the most miserable description, fairly well-roofed but without any furniture or conveniences, with the exception of a narrow platform raised a few feet above the earthen floor for sleeping on. Behind each house I observed a small thatched structure which they called the *Matakau*, the sacred place of the Aléfuru wherein, by burning dammar, he propitiates the Great Spirit *Allah Stalla*. The Matakau is a small platform erected on a short pole and roofed over with palm-leaf thatch from whose eaves all round hangs down a long fringe of split-up palm leaflets. Inside are preserved a knife, a spear, a *Kau turin* or thick walking-stick constantly carried by the natives on their journeys (with these they are adepts at quarter-staff; I was much amused by seeing two children practising with singular skill their cuts and guards, quite unconscious of being watched), a dish containing siri, betel and chalk, and a piece of scarlet cloth. Before sowing any of their fields, some of the seed is always placed inside the Matakau, dammar is burned, and their ritual performed in order to secure its fructification.

MATAKAU.

Their most dreaded and respected oath is made, holding the sharp top of a sago palm leaf in the hand, on the sacred knife and spear taken from the Matakau; for they believe in the power of these pomali-weapons to harm them at any unguarded moment. Another form of adjuration is in drinking after making their declaration, water in which had been placed salt (that they may melt away), a blade of Kussu-grass (that they may be scarred as by its edges), a lance and a knife (that their bodies be pierced, cut and run through) if they have sworn falsely.

Proceeding on our way, we camped for the night in the forest under a canopy made of the long leaves of the sago-

palm cut down and arranged for us by the Aléfurus. Unfortunately for the quick progress of our march, my German companion, unaccustomed to travel, was easily fatigued, and both the native chiefs were devotees of the opium pipe, and were constantly finding all manner of excuses for a halt too readily acquiesced in by Mr. Bergmann. No sooner was the order given than their blankets were at once spread on the ground, and the soothing narcotic produced.

Next day we journeyed through Kussu-grass fields, with scarcely a vestige of forest, and only sparse belts or low scrub of *Melaleuca* and *Melastoma*, without having the satisfaction of seeing a single bird or insect. The country now began to rise in successive steps, first over a height of 500 feet, down 400 feet, to rise again 600 feet.

On the third day we were compelled to camp at noon on the banks of the Klaba, on another of those excuses—that no other stream could be reached within the day's march—which the Rajah of Kajeli, who had never gone the road in his life, was constantly making to enable him to resume his soporific smoke. The Klaba, like all the other streams we had crossed, was making for the Apu. The valley was set with more clumps of trees and cycads than any of those we had yet traversed.

A short way behind I had observed tall bamboo spikes bristling thickly among the grass, for the purpose evidently of catching deer and pig driven towards them by firing the grass in a wide semicircle around them. After our huts—made of the bark of *Commersonia echinata*, a very abundant tree there—were erected, I started with my hunters and some of the Aléfurus as beaters, in hopes of securing a haunch of venison for our larder. We were fortunate in meeting within an hour with two little herds, from the second of which I secured a fine young stag. While it was being prepared, I scoured the bed of a dry stream behind the camp, and caught numerous fine Tiger Beetles (*Cecindelidæ*) and many species of a *Tenaris*, a butterfly closely resembling the *Tenaris urania* of Amboina, but being much paler, I have separated it by the name *T. buruensis*.

Next day another very short march was made, a halt being called on the pretext that a ridge of the mountain in front of us was Küing or tabooed. As we could not pass over it before

sundown, and might not be camped on it, we had to pass the night again in the forest in a dense rain, on the slope above our former camp, 1500 feet above the sea. At break of next day we continued the ascent of Mount Makka to about 2000 feet above the sea, passing through low sparse jungle full of *Dipteris horsfieldii* ferns and thickets of the bracken (which so often accompanies it), till we came on the Küing region which had been a great forest, but had only recently been burned down leaving many of the lifeless stems standing, and from the falling of whose dead limbs the Alĕfurus seemed to stand in great dread. No one dared to speak to his neighbour during our passage; I was besought not to shoot, and above all no one might use certain proscribed words for fear of disaster. No Buruese of the interior, it is said, can dare to approach the sea so near as to hear the beating of the surf without falling ill. Whether the superstition has arisen from the fact that the sea could be seen from the high elevation we were on, or whether it was because it might be the residing place of hostile spirits, I do not know. All along the way I could hear them repeating some sort of invocation, and on quitting the noxious region, one of the men stopped behind to erect another of those little white stakes three to five feet high, which we had seen at various places along the tabooed region—a branch carefully stripped of all its bark, its extremity wrapped round with a piece of scarlet cloth, and sharpened, to be tipped with a morsel of pinang nut. I imagine these pillars to be thanksgiving offerings to the spirit of the place for a safe passage.

Descending to the river Wohangan, which we crossed at about 1000 feet above the sea, we halted for lunch, the Alĕfurus rubbing their limbs and bodies till they were quite blistered, with the leaves of a very sharp stinging nettle, *Urtica cvalifolia*, "to take away their fatigue." We had at last entered a more wooded country, and I noted on the damp shade many fine *Zingiberaceæ* never seen before in flower, and a *Didymocarpus* with a white corolla margined with deep indigo. Along the banks of the stream I observed also quite a number of butterflies I had not seen elsewhere, and were I to return to Buru I should certainly make a prolonged stay near this river.

Rain compelled us again to camp in the forest. After a

comfortless night we ascended the steep side of the Woresa, this time to 3000 feet, camping on its farther slope in another deluge of rain, in which we were thoroughly drenched. The Aléfurus extemporised for themselves elegant shelters by piling a thatch of extra branches on the tied-together tops of neighbouring bushy shrubs. These, dotted about round our larger bark-made huts, formed, when lit up by our large central fire, quite a picturesque camp, which we were too wet to be in a humour to enjoy much.

We proceeded next day in a very unfit state from the chill of the previous night, but we had not gone far when some anxiety was caused by finding the ground set with bamboo spikes. Not knowing whether this was a sign of hostility towards us or against some former enemy we kept the baggage back a little and went on ourselves ahead, with loaded arms; but finding no other traces we descended without further thought of ill to the Wai Gelan, another large river, making, as all the streams we had yet crossed, to join with tributaries of the tributaries of the Apu. Except at a few spots, the paucity of birds, insects, and also snakes for which Buru has a bad reputation but of which we had not seen a single specimen, surprised me very much. From the Wai Gelan the ascent—each height exceeded the one before it all the way to the coast—was very steep and slippery, which the Aléfurus, inciting each other with cries of *Gossa, gossa* (good, good), required all their strength to get our baggage up. At 2400 feet, coming on a few houses called Wasilalé in the middle of a forest garden, the first signs of life we had seen since leaving the river Blöi, we decided to halt for the night, and press forward to the lake next day.

We took up our quarters in a rest-house of the most abject description, but quite in keeping with their own miserable dwellings. Three or four men, who had shortly after our arrival started off evidently to their gardens, returned carrying between them a large pig which they had killed to mark the rare event of European visitors in their midst. The women and girls hurried about bringing blocks of stone, with which they formed a large paved area to serve as an oven, whereon they piled a roaring fire till the stones began to burst from the heat in loud reports. As soon as the stones were heated to the

THE HUT-CLUSTER, WASILALE, ON THE SLOPE OF THE GUNUNG DUPA.

heart, hastily clearing off the fire they threw the pig body-bulk on the glowing stones, closely covering it up with fresh green banana leaves. In little over an hour we had served up to us a piece of pork baked to perfection, the most deliciously flavoured I have ever tasted. When we had rested some time after our meal their jubilation was further marked by a musical performance given in one of their huts, and, as we were invited to attend, I had an opportunity of seeing the interior arrangement of their houses.

They were constructed of uneven strips of tree bark, roughly set up side by side on the unlevelled ground, held in place by narrow rinds of bamboo on each side, tightly tied together by thongs at the gaps between each strip of bark. By these wide chinks the pigs and dogs made the dwelling as much theirs as the owner's. The roof was of palm thatch and badly put on patches of bark. At both gables was a quadrangular hole to serve as doorway and window, closed by a squarish piece of bark hung by a thong through a hole in the wall above it. Between these openings there ran a central passage, full (as I saw it) of pools of water. The space on each side of this passage was divided off by low bark partitions into three or four narrow stalls (across the top of which was piled their store of wood logs) such as might be found in the worst possible cowhouse; while against the wall where one would look for a manger was a small platform raised two or three feet from the ground, to serve for seat or bed. The fire was made anywhere which was for the moment most convenient—in the passage, or in one of the stalls—the smoke oozing through the numerous chinks and by a small patch raised in one of the rows of thatch. There was not in the whole dwelling a single article of furniture or any decorative artifice or a single device for affording convenience or comfort.

To accommodate me with a seat to listen to the musical "function," a large stone had to be brought in. The performers, who were of both sexes, disposed themselves in the passage on stones and logs. The men sang an improvised song to their own vigorous accompaniment on the native *tifa*, or drum, to which the women, sitting on their heels, languidly supporting their heads on their arms, which rested on their knees, contributed an unchanging refrain at the end of every

few words of the song. The men seemed to enjoy themselves, often laughing heartily at their own improvised conceits, but the women might have been absolute automata; for not a single expression of pleasure, interest, or enjoyment ever passed over their impassive features. The exhibition was one of the saddest possible pictures of the miserable position among the Aléfurus of the woman, who, though not treated with cruelty or harshness, lives in abject uncomplaining slavery—as if for the man alone all things, woman especially, were created.

Next morning, starting early, we continued our ascent through dense forest, full of Ternstrœmaceous trees to 3600 feet above the sea, the highest point reached in our journey. Just at the summit I came on a curious Pomali sign set up in the forest to protect probably some part of it from depradation. Its exact meaning I could not find out. It consisted of a low house shaped structure, somewhat like the Màtakau seen at Wai Blöi village, and fixed in the ground, protected from harm by large wide couples of wood. Under its cover six little pillars were set in the ground; on the top of one was a peg a few inches high whose tip was set into a cross-piece of sago-palm pith forming a T device, while into this cross-piece were inserted two small nails of wood, each bearing a pellet, the root of the *Halia* (? the officinal ginger); on two others, whose tops were encircled by a rattan girdle, within which several wooden wedges were driven, sharp bamboo spikes (such as are stuck in the ground to wound unwary travellers) were suspended by a cord; the fourth had its summit split for some length by two or three wedges of wood; the fifth, girdled with a rattan ring, had a piece of *halia* inserted below a chip of wood and transfixed to the summit with a peg, while the sixth was a bamboo full of water. The Aléfurus accompanying me said, that each pillar indicated a species of retribution that would overtake the trespasser.

Commencing our descent we reached a stream running in a westerly direction, which conducted us to a few houses on the margin of the Lake, which had been visited by white men but three or four times in as many hundred years.

CHAPTER II.

AT LAKE WAKOLO.

The Lake—The people there—Garments—Cultivation—Arms and accoutrements—Marriage—Death rites—Superstitions about the lake—Explanation of its position and of the absence of fish in it—New birds—Great disappointment—Return to Kajeli—Thence to Amboina—Compelled to leave the Moluccas—A kind farewell—Leave for Timor.

Mr. Bergmann, the Post-holder, had hoped, he said, to find some 2000 people living round the lake, and to stay for at least a week or ten days; but we found only some seven or eight houses as poor as the few we had already passed, and he decided on the afternoon of our arrival to start back in a couple of days to the coast. This was a grievous disappointment to me after so difficult and arduous a journey. As he would not be induced to stay, and without the presence of the Rajahs who would accompany him I could obtain nothing, either in the way of food or of porterage, I could only make the most, therefore, of the few hours at my disposal. I devoted the remainder of the first day to seeing something of the people, and in sketching their features.

The lake mountaineers, living so far removed from all coast interference, and rarely, if ever, visiting the shore, should be better representatives of the Buruese than the low country tribes who are now quite tinctured in manners and customs, as well as in race, by an infinite variety of influences—and where indeed is the race now to be found not so contaminated by extraneous forces? The ideas as well as the manufactures of western lands are beginning to be felt and seen in the huts of the rudest tribes, and among the people the most distant from civilisation. It is therefore more incumbent than ever on all travellers to record with the utmost fidelity every minutiæ of the customs and ideas of the rude peoples they encounter, for with the disappearance of their untainted

legends, words and thoughts, will die out a chapter of far-past history that can never be recovered again on the globe.

The men are of medium height—averaging about 5 feet 2 inches—and a little taller than the women. They are a weak, emaciated, ill-conditioned, and somewhat effeminate-looking race. Many of them suffer from the fungoid skin disease so often met with among the badly nurtured peoples further to the east. They are not a warlike people, and are not head-hunters like the Ceramese.

In colour they are brown, or yellowish brown, and, as far as my observations go, none of them are black as the Aru people are. Their hair is fairly abundant on the head, but not profuse, in fact rather scanty on other parts of the body. Their faces are bare, as a rule, though a few have a few long hairs at the corners of the mouth and the upper lip. The head-hair is not worn in the high-matted frizzled coiffure as seen among some of the Papuans, but it is curled in a more or less loose manner well seen in the figure on the opposite page. It is parted in the centre as a rule, and allowed to hang down on both sides in loose irregular curls, appearing through and above the kerchief which is worn round the head. Dr. Bastian, in his 'Indonesien,' states that the Wakolo Lake Buruese have smooth hair; but this is not absolutely the case. Nearer the coast, however, hair as straight as in any Sundanese is met with. That form of nose with high dorsum and over-hanging tip which I observed conspicuously in Timor-laut, and subsequently in the interior of Timor, as seen in the concluding Part of this book, was not observed among the Buruese; nor yet that tall and more athletic build of man (and woman) which could not escape observation in both of the islands just named. The Wakolo women had the same meek and submissive bearing that I had noticed in those met with nearer the coast.

Very few of them wear ornaments beyond a small stud of silver in the ear; the children are provided with a piece of dried intestine of the *Cuscus* in their ear-lobes, and round their necks; while both sexes wear armlets of shell, of a thong-like corneous coralline called by the Malays *akar bahar*, and of the intestine of the *Cuscus*.

The garments worn by the men were the usual T-bandage,

NATIVE OF WAKOLO VILLAGE, LAKE WAKOLO.

and by the women a short sarong, or petticoat, or a long loose smock-like robe.

In fields cleared out of the forest—which seem to belong to the man who has cleared them, and his heirs, as long as they do not return to wild forest—they cultivate tobacco, corn, and the usual sweet tubers, species of *Convolvulus* and *Colocasia*, which they eat to the juice of the boiled *Saun* (*Pandanus ceramicus*) one of the most magnificent scarlet fruits of their forests. Not much rice is grown, but it is received in exchange from the Aléfurus of the lower country for tobacco and tubers, tifas (or drums), and the strong woven *Coi* or wallet, so universally carried. I was not permitted to go into their fields, as strangers and coast people are tabooed, for fear of some evil befalling their poomalied seeds, and cannot, therefore, speak of their mode of cultivation. From the cotton (*Gossypium micranthum*), which they cultivate themselves, they make their own thread.

The only baggage an Aléfuru carries with him besides his *kau-turin* or cudgel, and a spear, is the *Coi*, a strong satchel slung on his buttocks by a cord round his waist, in which he carries his tobacco and those prized comforts of his tribe—siri leaves, betel-nut, and chalk often contained, in a slightly ornamented gourd. In former times the women in every village in Buru could weave these cois; now, however, the lower country tribes, having acquired increased wealth by the development of trade in the various products they so easily grow or rear, and with wealth laziness by their ability to supply their wants without labouring, have quite forgotten or abandoned the art, and are dependent for their supply on the mountaineers to whom the knowledge of their manufacture is confined. The cloth, called by them *kain fuka*, of which these satchels are made is a very strong almost indestructible canvas, which they render perfectly waterproof by rubbing into it the juice expressed from the bark of a tree, *kulit rofu*, probably one of the *Artocarpeæ*. To them is also confined the art of hollowing out of Pinang and Nangka (*Artocarpus*) logs, of the tifas or drums, which are so indispensable at all their feasts and religious ceremonies, as well as of the manufacture of their spears and knives, the art of iron working also being forgotten by the dwellers nearer the coast.

Marriage among them, as far as I could learn, was the simple purchase of a woman for a large sum in all manner of trade articles, and is celebrated by a feast. Very often she is purchased when yet a child, and is reared in the house of her master and husband, who may have as many wives as he can afford. If the husband cannot pay the full price at once, his family have to undertake part of the responsibility of payment, and till then the woman is in servitude to the whole family. On the death of the man she is reckoned as part of his goods, and falls with his other property to his heirs, who may sell her again to another suitor for a price not less than she has cost. The children of the union are the father's exclusive property and thereafter of his relations. If no suitor desires to marry his widow she remains in the cheerless lot of a menial slave and concubine of the husband's family.

Their death rites are also curious and interesting as being in some respects similar to those practised in different parts of Australia. As soon as life is extinct the man's body is brought out on a bier in front of his house and laid on the ground, with the head in front of a stake driven into the ground. The bier is struck several times and the questions put, "Have you died by the will of Allah Stalla?" or "Has death been the result of the machinations of mortal man?" If the body move forwards to strike the stake, the reply is supposed to be in the affirmative. If the intimation is that death has not been natural, the corpse is questioned in order to find the delinquent through all the Rajah-ships, till the correct one is indicated; then through all the Soas or villages, and through all the individuals of the selected Soa, till the culprit's name is obtained, who is at once seized and condemned to pay a death fine, for the backbone a certain price, for each right and left rib, for each hand and foot, for the head and the contents of the body, each a fixed sum; altogether a large amount in every species of trade article.

The Buruese are firm believers in Swangies, or spirits of their fellows endowed with the power to go about disembodied, working evil (generally) to their neighbours. An individual with this power is greatly dreaded, and derives not a few presents, for the purpose of retaining his goodwill, as also

VIEW OF THE LAKE OF WAKOLO.

payment from those who desire some evil to befall an enemy without suspicion of its originator. The Swangi is supposed to be able to cover with misfortune whom he will without their being aware whence the disaster comes.

Their dead are buried in the forest in some secluded spot far from other graves, and marked often by a *merang* or grave pole, and over which at certain intervals their relatives place tobacco, cigarettes, and various offerings. When the body is decomposed, the son or nearest relative disinters the head, wraps a new cloth about it, and places it in the Matakau at the back of his house, or in a little hut erected for it near the grave. It is the representative of his forefathers whose behests he holds in the greatest respect.

The day after our arrival was spent from break of day in botanising, collecting birds, and in examining the lake. This is a magnificent sheet of water, several miles in diameter and some 40 to 50 fathoms deep, indented with many beautiful bays, embracing the hills which abruptly rise up from it on all sides. It was not an easy matter to get the Merinyo of the place to give us a boat and rowers to make an examination of its margins, and only after a long invocation to the spirit of the Lake would he consent to accompany us. It is only with the utmost awe and dread that they trust themselves on its surface. They have many strange legends concerning it. One of these is that at certain periods a Lagundi tree (*Vitex* sp.) suddenly grows up the centre of the Lake, its appearance being accompanied by fearful storms of wind and waves, and the terrified cries of the birds that crowd its margins. On the subsiding of the storm the Lagundi is found to have disappeared. Another superstition is, that on the firing of a gun a thunderstorm is liable to break out, sent by the angered spirits. Every chief, therefore, on his arrival at the Lake plants a white stick in the ground as a signal of peace. The Wakolo men who rowed me kept up an invocation the whole time we were out, and they positively refused to take me out into the middle or even very far from the shore. A crocodile—one of the animals sacred in the mythology of Buru—is also supposed to reside in the lake, whence once a year it pays a visit to the shore.

It is singular that no fish except eels live in its waters.

Lying in the very centre of the island, at a height of some 1900 feet above the sea, and surrounded by high hills—except at one point, where, it is said, though I could not detect anything to assure me of the truth of the statement, that the Wai Nipe runs out of it—it has much the appearance of a lake filling up the crater of an old volcano, to which their legend of its periodical troubling may have some reference. The margins of the water were set with flags and shrubby pandans, which gave shelter to thousands and thousands of ducks (*Dendrocygna guttata*)—of which I secured a large number—little Grebes (*Podiceps*), and Cormorants (*Phalocracorax*), and several species of Water-hen (*Porphyrio*). The whole day was spent in skinning these birds, and putting up the plants in drying paper.

On the following day some of the women returning from their fields brought me a specimen of a *Myzomela*, which they had taken with the gum of an *Artocarpus* tree, which delighted me immensely, as no species of this genus was then known to extend so far to the west. It turned out on examination to be an undescribed species, which I have named *Myzomela wakoloënsis*. I asked them to show me where the specimen had been obtained; but as it was in their gardens which are tabooed to coast people, I would not persuade them to admit me. On offering, however, a large reward for additional specimens, several women set off back to their fields, whence in the afternoon they returned with a quite number all fluttering on a string; most of them had lost their tails and were entirely smeared with gum, a few only being at all presentable. Among these true scarlet Myzomelas was an immature Nectarine bird in a wretched condition, with the basal portion of its beak greenish-yellow and the rest black, which is probably also another and unknown species of *Myzomela*. By working continuously right through the night till sunrise, the whole of the skins were ready for transport, as well as nearly a hundred species of plants.

When the coolies were mustered to shoulder the baggage only two or three put in an appearance, the rest had deserted, and only after impressing into our service some of the women did we manage to start with the food necessary for the journey. It was not with the most amiable feelings towards

the Authority at Amboina that I was forced to leave behind me the herbarium I had taken such pains to collect. The skins I carried myself, leaving my own men free to assist with the food supply. Reaching, with our overburdened porters, the little hamlet of Wasilalé, where we had spent a night on our coming, my companion who was suffering from fever, wished to remain till the attack had passed; we agreed, therefore, that, as I was anxious to reach Kajeli before the arrival of the Amboina steamer, I should press on in advance with my own servants and baggage, and on arrival at the Blöi river send him the necessary additional porters. On the forenoon of the fifth day from the Lake I reached the Wai Blöi village, whence I despatched assistance to my companion, and reached Kajeli the same evening.

I had hoped to be able to get across to the region in the S.E. of the Bay of Kajeli, where alone in Buru the singular Hog-deer (the *Babirusa*), which is known elsewhere only in Celebes, was to be found; but again I was disappointed for want of porters and rowers. This singular animal uses its curious upturned and hooked teeth, the natives told me, to hold to the bottom of ponds by, when hard pressed by hunters.

So disappointed was I with my trip to Buru, from which I had hoped much, and might have accomplished much but for a display of absurd and petty jealousy, that I was glad when the steamer of the 12th arrived from Batjian to carry me back to Amboina, which was reached the same evening.

Finding that Mr. Riedel's attitude towards us was such as to make it quite useless to attempt to carry on any investigations in the islands of the Moluccas under his sway, I determined to leave for a time to attempt a journey in the interior of the little known region of Timor under the Portuguese crown. It is only fair to state that the conduct of the Resident was utterly repudiated by the Dutch Government in Java, and on my arrival in Batavia, six months afterwards, I received from them the kindest and most ample apologies.

The steamer, from which I had just disembarked, having to remain two days in Amboina, we hastily packed up our belongings and continued our voyage in the same vessel. The friends through whom this last sojourn in Amboina had been made so full of enjoyment, Mr. Justice and Madame Van

Deventer, the Commander of the troops Colonel Demini, now H.E. the Governor of Acheen—to whom I am indebted for the gift of a large and valuable collection of ethnological objects from Ceram—Major Van der Weide, the Chief of the Medical Staff, and Dr. and Madame Machik, our most kind hosts to whom we owe our introduction to so many delightful friends, paid us the compliment of accompanying us on board to say farewell.

APPENDIX TO PART V.

I. *List of the* BIRDS OF BURU, *compiled from papers by* Mr. A. R. WALLACE *in P. Z. S.* 1863, *p.* 18–36, *by* Count T. SALVADORI *in Ann. del Mus. Civico di Stor. Nat. di Genova, VIII., the Author's own Collection, and other sources.*

1. Haliastur leucosternus, *Gould.*
2. Baza rheinwardti, *Sch.* Timor. Moluccas.
3. Accipiter rubricollis, *Wal.* Ceram. Gilolo.
4. Accipter cruentus, *Gould.* Timor.
5. Athene hantu, *Wallace.*
6. Scops buruensis, *Sharpe.*
7. Geoffroyus rhodolæus, *G. R. Gr.* Amboina. Ceram. Goram.
8. Eclectus cardinalis, *Bodd.* Moluccas. New Guinea.
9. Tanygnathus affinis, *Wal.* Amboina. Ceram.
10. gramineus, *Gm.*
11. Aprosmictus buruensis, *Salv.*
12. Trichoglossus cyanogrammus, *Wagl.* Ceram. Papuan Islands.
13. Eos rubra, *Gm.* Amboina. Ceram. Matabello Islands.
14. Caprimulgus macrurus, *Horsf.* Whole Archipelago.
15. Dendrochelidon mysaceus, *Less.* Moluccas. New Guinea.
16. Cacomantis virescens, *Brügg.*
17. Eudynamis orientalis, *Linn.* Ceram.
18. Centropus medius, *Bp.* Ceram. Gilolo.
19. Scythrops novæ-hollandiæ. *Lath.* Timor.
20. Sauropatis chloris, *Bod.* Whole Archipelago.
21. Halcyon sancta, *Vig. & Horsf.* Eastward Islands.
22. Alcedo ispidoides, *Less.* Celebes. Gilolo.
23. Tanysiptera acis, *Wall.*
24. Ceyx Cajeli, *Wall.*
25. Merops ornatus, *Lath.*
26. Eurystomus pacificus, *Lath.* Eastward Islands.
27. Pitta rubrinucha, *Wall.*
28. Budytes viridis, *Gus.*
29. Acrocephalus australis, *Gould.*
30. Cisticola rustica, *Wall.*
31. Phyllopneuste javanica, *Bp.*
32. Oriolus buruensis, *Quoy & Gains.*
33. Criniger mysticalis, *Wall.*
34. Artamus leucogaster, *Val.*
35. Myiagra galeata, *G. R. Gr.*
36. Monarcha loricata, *Wall.*
37. Rhipidura tricolor, *Vieil.* Moluccas. New Guinea.
38. buruensis, *Wal.*
39.
40. Pachycephala elio, *Wall.*
41. lineolata, *Wall.*
42. rufescens, *Wall.*
43. Dicrurus amboinensis, *G. R. Gr.* Amboina. Ceram.

44. Edoliisoma marginatum, *Wall.*
45. Philemon moluccensis, *Gm.*
46. Dicæum erythrothorax, *Less.*
47. Zosterops chloris, *Bp.*

48. Myzomela Wakoloënsis, *H. O. Forbes.* P. Z. S. 1883, p. 116. (Fig. Gould, B. New Guinea, part 18.)

The full-dress bird is entirely scarlet, the bases of the feathers being black; the wings, the tail, and the preocular spot are black; the upper wing-coverts are black with a scarlet band on the outer webs nearly in the middle, but not extending to the extremity of the feather; the inner margins of the remiges are white; the irides are rich brown; the edges of the lower maxilla yellow; tongue yellow; legs and feet yellowish green; soles yellow.

The young male is at first almost entirely greyish brown; the throat is pale grey; but quite below the maxilla and under the eyes the orange-red colour indicates the coming scarlet; the back is greyish-brown, but of a deeper colour in the uropygial region; the wings and the tail are brownish grey; the breast and under tail-coverts greenish fulvous; the margins of the upper wing-coverts pale fawn colour with, in some lights, reflections of red; the margins of the remiges are olive-grey; the throat, the front of the head, the breast, and the uropygial region are the first to assume the scarlet colour of the adult; the angle of the wing has a dirty-white spot, which, with the olive-grey margins of the remiges, are the last to change to black.

49. Nectarinia proserpina, *Wall.*
50. Cyrtostomus zenobia, *Less.* Amboina. Ceram. Ké.
51. Calornis obscura, *Bp.* Moluccas.
52. Munia molucca, Moluccas. Timor-laut.
53. Osmotreron aromatica, *Gm.* Amboina. Ceram.
54. Myristicivora melanura, *G. R. Gr.* Moluccas.
55. Carpophaga perspicillata, *Temm.* Batjian. Gilolo. Waigiou.
56. Ptilopus rivolii, *Prev.*
57. viridis, Amboina. Ceram. Goram.
58. Macropygia amboinensis.
59. Chalcophaps indica.
60. Megapodius forsteni, *Temm.*
61. wallacii. *G. R. Gr.*
62. Glareola grallaria, *Temm.* Australia.
63. Charadrius fulvus, *Gm.*
64. maguirostris, *Lath.* Celebes. New Guinea. Timor-laut.
65. Numenius uropygialis, *Gould.*
66. Strepsilas interpres, *Linn.*
67. Herodias egretta, *Gmel.*
68. Butorides javanica, *Horsf.*
69. Bubulcus coromandus, *Lodd.*
70. Ardetta flavicollis, *Lath.*
71. Nycticorax caledonicus, *Gmel.* Australia to the Keeling Islands, in the Indian Ocean.
72. Porphyrio melanopterus, *Temm.*
73. Erythra leucomelæna, *S. Müll.*
74. Gallinula frontata, *Wall.*
75 Ortygometra cinerea.
76. Hypotænidia philippensis, *Linn.*
77. Dendrocygna guttulata, *Temm.* Ceram. Celebes.
78. Tadorna radja, *Less.* Moluccas, New Guinea. Timor-laut.
79. Podiceps tricolor, *G. R. Gr.* Moluccas.
80. Phalocracorax melanoleucus, *Vieil.*
81. Sterna melanauchen, *Temm.*

II.—*Description of a New Species of* Tenaris.

Tenaris buruensis, Mihi, sp. nov.

Allied to *T. catops*; differs in having the fore-wings of a less oval form and more broadly marked with brown at the apex, the hind-wings not suffused with ochreous at the base, and the ocellus much larger, with a well-defined pupil, as in *T. diana*, Butl.; on the underside it differs in having the apical brown band of the fore-wings broader, and the ocelli on the hind-wings much larger and more broadly bordered with brown; the ground colour of both wings is of a sordid, instead of pure white as in *catops*. Buru, 16 Nov., 1882, No. 2379.

III. *Some Buruese Words.*

alive	deneve	hot	hinduin
banana	fuat	hungry	lappa
boat	waga	head	ulun
bird	manut	hair	ulun-fulun
butterfly	lahin	leaf	karumun
come	komahi	man	gaba-mana
deep	dowd	night	detok
deaf	daprengemoh	rattan	uah
dead	damata	river	wai
Deity	Alla-stalla	road	tuhun
eat	makah	stone	vatu
ear	anting-anting	star	gai
evening	modan	slowly	mara-mara
fire	bana	speak	sarah
finger	fahan wangan	taboo	köing
flower	sawin	tree	kaun
father	nama	tongue	maän
far	breman	woman	fina
fish	ikan	wind	anin
foot	kadan	wood	kau
fruit	fuan	north	Giwa rete
great	bagu	south	„ lawe
give	huké	east	Hangat kehia
good	gossa	west	„ selo
hand	fahan	sun	Hangat
haste	naik-naik	moon	Fulan
hold	pesse		

PART VI.

IN TIMOR.

CHAPTER I.

SOJOURN AT FATUNABA.

Arrival at Dilly—Dreadful effects of fever—Search for a site for a house—The town of Dilly an ethnographical studio—Fatunaba—Our residence—The enchanting view thence—Interesting birds and plants—Difficulty with servants—Preparations for departure into the interior—Dialects.

SAILING on the 15th of December from Amboina, we spent a couple of days in our favourite strolling-ground of Banda, and sighted Timor early on the 19th, anchoring at noon in the harbour of Dilly, where we were heartily welcomed by our old friends the Governor, Major da França, and his family. We were above measure saddened to see their terribly emaciated countenances, which proclaimed more forcibly than words, the pestiferous nature of the climate. One of their number—the youngest—already slept under the shade of the Santa Cruz; in all of them the notorious Dilly fever had killed down the cheerful vivacity, buoyancy of spirit and bright eye with which they had stepped ashore in the month of May. With the utmost kindness commodious apartments were offered us in the Palace, but it was perfectly evident that if I wished to accomplish any successful work in Timor, it could not be from Dilly as a centre, constantly exposed to the pestilence that nightly rises from the marshes surrounding the town.

On proposing to make our residence somewhere on the hills, the Governor suggested to me the neighbourhood of the convent of Lahani, situated a few miles behind the town in a picturesque valley. Though more salubrious than any part of the town itself, the locality was still too much within the fever zone to tempt us to court a renewed attack of the malaria, whose dire effects we had sufficiently experienced in Timor-laut.

Early on the following morning, therefore, on horses kindly provided by the Government Secretary, Mr. Bento da França, and accompanied by Senhor Albino—one of the most genial spirits and most influential officials in Dilly, who in his own person was Master of the Port, Director of Public Works, and Colonel of the native troops—we rode up the hills in quest of a location. A damp mist hung about the town as we started, but when we had ridden a few miles southward and ascended some 300 feet, the sun rose and displayed before us a landscape whose great beauty I was utterly unprepared for, disheartened somewhat as I was by the hot sandy town and the depressing effect of the fever-stricken condition of the Europeans. Before we had reached 500 feet above the sea, I felt as if in a new atmosphere, so fresh and exhilirating was the air. Now winding round the flanks of deep glens, the watercourses dug out by the rain (for there was neither path nor road otherwise), now ascending slopes so steep as to make it impossible to sit on horseback without clutching grimly to the mane, now by the edge of sheer precipices, the path brought us, at 1700 feet, to a coffee-garden whose shrubs growing under deep shade, exhibited the richest display of fragrant blossom that I have ever seen. Close by on a projecting shoulder, over which the summit of the mountain rose 1000 feet higher, was a grassy plateau of a few yards in width commanding a view of unexampled beauty, and convenient to a quiet nook, where under the shade of a grove of Kanary trees a sparkling stream fell with a noisy purl over a rocky projection into a shallow pool. A few feet in front of the plateau the ground dropped suddenly into the wooded sides of a precipitous valley, widening out as it descended, till its enclosing spurs broke off abruptly in the green seaward plain, beyond which the white spire of the church, the Governor's Palace, the grey dwellings of the natives, and the guard-ship lying in the bay, glinted through the palms. Due north full in our face, rose abruptly out of the sea the high blue peaks of Pulo Kambing, while half hidden by the arms of the valley down which our view extended, on the left the lofty eastern buttresses of Allor, and on the right the serrated ridges of Wetter, touched the sky, boundaries within which the blue sea lay calm as an inland lake. No second thoughts were

necessary to decide that our dwelling should stand there, and I carried back with me to A—— a sweet-scented rose plucked from a bush growing near the spot as a hopeful token of the goodness of the site. During our descent a largish beetle banged itself against my hat, which I found to my delight to be a specimen of the rare rose-chaffer (*Lomaptera timorensis*), the only known specimen of which, if I mistake not, taken some twenty years before by Mr. Wallace in this very island, has remained unique ever since. On my arrival at the Palace, breakfast was proceeding, and I placed my prize under a glass shade in the room I occupied till my return from the table. Alas, during my absence a servant had cleared away the noxious *bicho*, and I never afterwards saw another specimen!

While arrangements, in response to the kind mandate of the Secretary to the native Rajah of Motaël in whose territory the Fatunaba hills lay, were being made for the erection of a bamboo hut for me, we spent some very interesting days in Dilly. The town, though vastly improved since Mr. Wallace's visit, was still disappointing in many respects, and its Hibiscus-lined streets looked poor and uninviting. The lack of money to carry out efficiently the necessary municipal arrangements was painfully evident. No more enlightened or energetic *régime* could be desired than that under the officers at the head of affairs during our sojourn in Dilly, through whom—and I use no mere terms of compliment—had the necessary resources been at their disposal, Portuguese Timor might have caught the tide of prosperity she has long waited for.

In going into the various offices and shops I was struck to find all business conducted, not, as in the Dutch possessions, in the *lingua franca* of the Archipelago, Malay, but in Portuguese. It has been a feature of all the countries occupied for any length of time by the Portuguese that they have so indelibly impressed their own speech on the rude tribes they have conquered, that its words have remained a part of their language centuries after their rule has passed away. On the other hand, in the Netherlands colonies comparatively few Dutch words have been thus kindly naturalised. In the different quarters of the town native police posted in little encampments are always on guard, and during the still nights

it was curious to hear from Timorese throats the *Alerto sta!* at the stroke of every hour. Besides the official staff very few Europeans live in Dilly; the entire trade of the island being conducted by Arabs and (chiefly) by Chinamen.

The streets of Dilly itself offer to the traveller a fine studio for ethnological investigation, for a curious mixture of nationalities other than European rub shoulders with each other in the town's narrow limits. At a single glance one sees that this crowd has few elements in common with that seen at Cupang, in the west. Tall, erect indigenes mingle with Negroes from the Portuguese possessions of Mozambique and the coasts of Africa, most of them here in the capacity of soldiers or condemned criminals; tall, lithe East Indians from Goa and its neighbourhood; Chinese and Bugis of Macassar, with Arabs and Malays and natives from Allor, Savu, Roti, and Flores; besides a crowd in whose veins the degree of comminglement of blood of all these races would defy the acutest computation. It was interesting to study the character of each in their unconscious ways one among each other. The Hindu, with a stately bearing, carried himself with a natural yet not offensive, air of superiority; the non-dominating, provident, industrious, unobtrusive Mongolian wended his way, obtaining rather than asserting the next place, and was looked on with respect and good-neighbourly consideration; the sturdy *Africano* rollicked about, noisy (generally drunk), careless, improvident, hated and feared by the indigenes, who fraternising with none of the interlopers in their land, and keeping themselves quite to themselves, sat about in small companies under the trees or on the shore, or moved about in their erect, haughty, somewhat sullen and suspicious way, but not at all shunning the town like the West-Timor people. The Arab led his secluded life among his own race, energetic, taking many hard rebuffs with few words, while the Malays, semi-Malays and trading peoples fraternised pretty freely with each other on the shore and over the sides of their praus.

The shop of Ah Ting, Major of the Chinese, was my favourite study-room while in Dilly, for there during the whole day came and went an endless succession of these nationalities for the purpose of barter or simply to lounge.

The most marked characteristic of the Timorese is their independence and self-assurance. With the utmost *sang froid* they would occupy all the chairs reserved for the use of Europeans, without for a moment, even on the entrance of an official of the Government, thinking of offering to give place, although on being asked they would remove with perfect good will, as if it had been a simple omission on their part not to have done so before. It is innate in him to feel that he is as good as any one else. Towards their own rajahs, however, they show much deference and respect, if not servility. One regrets the difficulty that exists in portraying in written words the life and vigour of these scenes.

It was interesting to observe the wide contrast between the character of the Mongolian and that of the Timorese. The former with extreme patience and perfect good humour, over and over again taking down, exhibiting, putting up, discussing the price of the same piece of goods with the same individual, who, regardless of time, with him the most inexhaustible element in nature, would break off without a word, to examine a score of different things that might chance to catch his eye, or to join in some discussion carried on by his friends away in the street perhaps, by-and-bye to return to only to break off again from his bargaining, which cannot possibly be concluded till one after another of his companions has in whispered consultation given his idea of the transaction under consideration. When at last he has made up his mind to purchase or exchange his produce for, say, cloth of so many arm-stretches, if he is not of more than ordinary stature, he brings the very tallest man of his acquaintance to be his standard of measurement, who considers it a duty to his friend to adopt every possible device to expand his chest and arms. Placing the end of the web at the tip of the longest finger of his left hand, and making a gigantic inhalation, he runs his right arm out to the fullest extremity of his finger-tips, invariably succeeding in getting an inch or two more than he ought as he picks up the mark, from which he will on no account, even though his eyes be never taken off the spot, remove his finger till the cloth has been cut. Should by chance he move his finger the slightest degree, the whole measurement must be done over again, and

even after the portion he has purchased has been severed it must be measured several times over both by himself and his friends. The suspicious Timorese has wasted his (to him) valueless time, and has satisfied for the moment his fancy; the Mongolian has a profit both on the produce he barters for, as well as on the commodity he disposes of, and by degrees amasses riches which the other can never attain to.

On Christmas Day, 1882, with two natives of Goa as servants, the only men who could be persuaded to venture among the hills with me, I removed to Fatunaba to superintend the erection of my bungalow, making my temporary quarters in a native shed in the coffee-gardens.

As the royal salute of twenty-one guns boomed from the fort below me on New Year's Day, I was reminded that I ought to be having a holiday; but had I left the men, even for a few hours, not one of them would have been found on my return, and days would have been required to hunt them up. On the 3rd, A. joined me, and by the 6th the house was completed —though the grass roof did not look at all rain-proof—rather to the astonishment of the Timorese, who perhaps had never done so continuous a piece of work in their lives before. When the work was quite finished they demanded a pig to celebrate the event, in accordance with custom; but as I had neither flocks nor herds they had to forage in the neighbourhood, whence one of them returned shortly with a nice fat specimen on the point of his spear, which, despite our most urgent protestations and threats, they cut up and divided in their own savage way on our new and deliciously clean verandah. By a bribe of kanipa (gin) all round we were relieved of the pleasure of seeing them cook and devour it.

By next day, all our baggage and the implements of our trade and profession having been dragged up the cliff-like face of these "Tiring-rocks," as "Fatunaba" signifies, our house was set in order. Notwithstanding its want of elegance, and an ominous lean that it had to one side, our pile dwelling with its three rooms opening in a line on to the verandah, was very comfortable and very convenient. An extra apartment was fitted up to serve for a bath-room in bad weather, when the delicious natural shower-bath in the stream below our door couldn't be used.

We were now ready for work; but before beginning in earnest, we decided to take one undisturbed day of rest. It was a delightful holiday of inactivity. We were both enchanted with the outlook from our verandah, whence a single turn of the eyes commanded a wide and varied scene. It would be as useless to attempt as impossible to describe the beauty and our intense enjoyment, of the hourly effects from dawn to twilight, the myriad combinations of the sunlight on the near hills, on the surface of the sea, and on the island peaks of Allor, Kambing, Wetter, whose ridges and crests rising at varying distances caught the sunlight at every angle and in every degree of intensity. We felt that it was well worth not a few privations to live day after day in the face of a scene of such surpassing loveliness.

My Goa men were both able to shoot, but as neither of them could skin at all well, my ornithological collections got on very slowly, for I myself gave the most of my time to the gathering of plants, which had not been at all carefully collected in Timor, while of the ornithology of the island, Mr. Wallace had already given us the chief features. Though no new birds were shot, those obtained were of great interest to us, especially the kakuak (*Philemon timorensis*), whose curious bawling cry in the gum-trees was invariably the first to awaken the silence of the dawn and the last to break off at night, and which had the exact habits of its relative which I discovered at Larat (*P. timorlaoensis*). As there, so here also, a species of Oriole, mimicking it in colour and in form so closely as to be almost indistinguishable when both birds are in the hand, was constantly seen feeding in the same tree with it. That in each of these different islands of the Austro-Malayan region an Oriole should seek protection under the ægis of the habits and strength of this one genus of birds and of no other equally powerful or fleet group, and that in the islands of the neighbouring region, where true Orioles abound, it has not been found to occur, is one of the most curious and remarkable facts in the whole of Natural History. *Neopsittacus euteles*, a gorgeous little green-and-scarlet parrot, and the fine white cockatoo (*Cacatua sulphurea*)—the males with black, and the females with red eyes—abounded round our dwelling, and gave us daily great pleasure by their

liveliness and by the snowiness of their plumage. One very bold visitor we could not bring ourselves to destroy even to add to our collection, the lovely scarlet *Myzomela vulnerata*, which, when we were quiet, often hopped down even on the rail of our verandah from its favourite perch on the top of a gum-tree close by. A *Mussænda frondosa* bush, and the tall grass-stems on the other side of the path from our hut were constantly resorted to by several species of Finch, the pigmy *Amadina insularis*, the *Munia pallida*, and the *Estrelda flavidirentris*.

My own hunting grounds were the slopes above our hut, where the vegetation was very different from that which I had hitherto been accustomed to in the richly-clad western islands or in the humid Moluccas. I can scarcely say that we had any true forest, for the trees rarely entwined their crowns overhead, and the ground was covered with sparse grass sufficient to give it a park-like look. The precipitous ravines afforded the only really dense vegetation that existed where out I laid the foundation of a promising herbarium. My means of drying the specimens, however, were very limited, as I could not manage at that time to requisition more labour to erect a drying-house; and unless in these regions plants are dried by fire heat, they become mouldy in a very short time even with the most careful attention, and are then a terrible heart-break to the collector. I was specially gratified in gathering on the bare hot clayey face of the mountain a lovely little sun-dew (*Drosera lunata*) growing luxuriantly in extensive patches. Accustomed to gather its kin at home in boggy heaths, I was surprised to find it flourishing in so dry an exposure; but on digging it up I found it held a store of moisture against hard times in the tuberous roots with which it was provided. This was a characteristic of not a few of the herbaceous plants growing on these arid slopes. Another plant, also of a home-family, one of the *Vacciniaceæ* afforded us a rare pleasure, like a breath from home every time we ascended to 2000 feet. This shrub, of an undescribed species I am delighted to find, grew in the ravines in the form of a tall bush, and has an open tross of rich scarlet waxy bells. Its low habitat in so hot a region is somewhat surprising; but the amount of "grey beard" lichen with which, like the rest

of the vegetation about it, it was loaded, told how cool and moist an atmosphere it was living in.

Among the tall grass fields one of the commonest orchids was the white sweet-scented *Habenaria susannæ*, remarkable for the great length of its nectaries. Diurnal lepidoptera were noticeably very few at Fatumaba; but at night more moths (belonging only to a few species) than at any other station where I had lived, crowded to my lamp. Among them the most abundant were two moderate-sized *Noctuæ*, a new species of *Ophiodes* and *Remigia virbia*, and a largish species of Humming-bird moth (*Protoparce orientalis*). I made it a point daily to watch the fertilisation of these Habenarias. They were invariably cross-fertilised during the night by a moth which, as it always left a few of its hairs on the stigma, I feel certain is the same as one and perhaps both of the *Noctuæ* just mentioned, but the tongue of both species is far too short ever to reach more than half-way down towards the minute drop of sweetness concealed at the very tip of the nectary. The large pollinia in many cases had been carried only as far as one of the petals or to a neighbouring leaf, as if the moth, finding the burden too great for it, had rested there, and succeeded in freeing itself of them.

Collecting was carried on till the end of February with all the vigour possible, my herbarium especially rapidly increasing in size; but I had fully expected to have been by then far in the interior. The weather, however, had been very disastrous for us, and we had had much difficulty with our servants. It was a weary tramp up to Fatunaba from Dilly, and as all our provisions had to be carried by our own men, they very soon tired of the exertion that this entailed, and of living so far from the *kanipa* stores of the town. One of the Goa men was an inveterate toper, and had very soon to be discharged. His place was taken by a younger brother, who proved a good and willing servant; but he could not stand the cold nights of the mountains, so when he left in ill-health, followed soon after by his brother dismissed for larceny, their place was filled by an Allor youth, who knew a little Malay. Goma was a servant faithful as a dog, strong and willing to work, but having not the slightest idea of European ways, which he had never seen, he afforded us much amusement, if not much

profit, by his willing attempts to serve us. As he was only delaying in Dilly, for a favourable wind to go home by, we soon lost him, and for a whole fortnight—days of privation anything but slight—we had to rely on ourselves for the performance of all our domestic duties, till our kind helper, Senhor Albino, sent us a Timorese, the son of a chief in one of the kingdoms of the interior, who had been for some time a prisoner in Dilly, but whose freedom was restored to him on the sole condition of his serving us faithfully as long as we wanted him.

The results of the haste with which our thatched roof was finished off soon became evident enough. At times not a single spot in the hut—except where our bed, roofed over with a waterproof sheet, stood—was dry. Everything of value, therefore, that we possessed, food, books, plants, gunpowder, clothes, had to be stored on or under this piece of furniture, so that we derived little rest or comfort from it. The repeated gales bent the hut itself so far that it would have been carried down the valley but for a couple of gum-trees which I had to fell and prop it up with. Our food supply was wretchedly poor and very scanty, often necessitating a purchasing expedition to Dilly to replenish our stores—visits which in our solitary life were red-letter days from the few hours of European intercourse with our kind friends at the palace which they brought us, for which we invariably paid dearly, however, in fever attacks—in A.'s case of a very violent kind—a few days after our return. Notwithstanding all these drawbacks, we had no lack of enjoyment of a most serene description in this rough and ricketty abode—if in nothing else, certainly in the inexpressibly delightful scene ever before us under the morning and evening sun, and in the bright moonlight nights.

With the natives we had a good deal of intercourse, as they came often past our hut on their way to Dilly wth their produce—chiefly Indian corn and European potatoes. Their character did not gain favourably on us. If their demands for *kanipa* were not complied with, they took themselves off in a very offensive and threatening way, muttering curses as they went. If not watched closely, they were apt to think that various useful or attractive objects of ours were belongings of theirs. Among them some had frizzy, some had straight hair,

some tall, others again short and stumpy—while in other characteristics they varied so much that it is impossible to believe them to belong to a pure race.

The weather by the middle of March having showed signs of clearing, the Governor with great kindness gave orders for an escort to be ready to accompany me into the interior as soon as travelling could be considered safe.

March 29th.—To-morrow, at last, I shall be able to start, my transport ponies having arrived this evening. To my dismay, however, only half as many as are necessary for my baggage. On inquiring of the Hindu officer in charge, I find that it would require a week to collect the extra number I wish. The only thing now possible is taking only a portion of the botanical drying-paper which is bulky and heavy, to advance at once to Bibicucu and send back for the rest. The saddle for the pony I am to ride has been forgotten also. The escort consists of the Hindu officer, who is to act as my guide, interpreter and adviser, and is charged with full authority over the rajahs in whose kingdoms I may stay, a Hindu corporal, and an official of the Rajah of Motael's kingdom through which we first pass, who is to be relieved by a like officer from each kingdom in which I may sojourn. He must attend from his own Rajah's headquarters to the headquarters of the next Rajah, and is responsible for every item, not of my baggage only, but of my person also, till relieved by his fellow in the neighbouring kingdom. My own authority is a friendly and most plenary document addressed to all the Rajahs that I may meet in the interior.

The whole of East Timor is apportioned out under certain chiefs called *Leoreis*, each of whom is independent and absolute in his own kingdom. At present there are forty-seven of these; but many of them possess far greater influence than, and exercise a sort of vassalage over, the others. Each *Reno*, or kingdom, is divided into districts each of which is called a *Suku*, ruled over by a *Dato*, who receives his orders from the Leorei by a special officer appointed for that purpose. The Dato has under him two other officials, a *Cabo* and a *Tenente* * who assist him in the regulation of the Suku.

Nearly every kingdom has its own dialect. Crawford says

* These terms are probably adopted from the Portuguese.

that in Timor there are forty different languages. I am not in a position to say whether they are dialects or languages; but I observed that in some districts the people did not understand the speech of their neighbours.

I feel quite anxious at leaving A. here alone. Female servants are impossible to be found in Dilly; but the old woman who looks after the coffee-gardens near us, has agreed to sleep in the hut within her call, and to assist her in her few domestic duties. She herself will not hear of any one else, and scouts the idea of danger from the natives, and is quite brave over it. Our friends at the palace desire her to make her home with them, but the fever risks of Dilly are too great. I do not like the neighbours over much, and am far from comfortable in the idea of leaving her so unprotected.

CHAPTER II.

ON THE ROAD TO BIBIÇUÇU.

Start for the interior—Vegetation on the way—Roads—Camp on Erlura—Mt. Tehula—Kelehoko and its flora—Pass a night under the eaves of a native dwelling—Huts in trees—Bed of the River Komai—Pass a night on Ligidoik Mountain—Character of country—Valley of the Waimatang Kaimauk—Singular scene—Unburied relatives—Burial rites—Grave-sticks—Rites attending a king's death—Swangies—Lose our way—Flora on Turskain mountain—Rajah of Turskain's—Botanical excursions—The rites of the sacred *Luli* and the choosing of warriors—The Rajah.

After many hours spent in arranging the burdens of the different ponies and men, I despatched the cavalcade at eleven o'clock (March 30th). The officer expressed the greatest astonishment at all absence of timidity on A.'s part on being left alone; but, on being reminded that she was an "English Senhora," he appeared satisfied that the fact was sufficient to explain the phenomenon. He encouraged her with assurances that there was nothing to fear for my safety, swearing to her on the cross-hilt of his sword that if anything befell me it would be over his body, and solemnly charged also the little old woman who was to be her factotum, that if she failed in her duty she might expect, on my return, all the calamities that her superstition could picture to her. Having constructed for myself a saddle and stirrups out of my Ulster coat and a rope looped at both ends, and given A. a last assuring word, I followed the cavalcade, ascending the well-known path above our hut to 2500 feet, where, turning eastward along the summit of the ridge, we travelled parallel to the coast, on our way, in the first instance, to the Rajah of Turskain's.

The vegetation was almost exclusively *Melastomacea*, with acacias, tamarinds, and gum-trees, while in the narrowest and most inaccessible gorges tall graceful tree-ferns abounded among thick shrubbery, whose components I could not

identify, and in many places broad areas of *Setaria* and *Paspalum* grass took the place of all other vegetation.

No such thing as a road exists anywhere in Timor. All the paths follow the knife ridges of the hills, or skirt along the face of precipitous slopes, invariably in deep ditch-like trenches, out of which a stumble would fatally land either horse or man hundreds of feet below. The Timor horses are wonderfully sure-footed, and seem quite accustomed to these difficult ways.

Having started late in the forenoon, it was found impossible to reach, before sunset, the hut where we had intended to camp. As we had no food with us for the men, we were compelled to practise the highwayman's art on the numerous natives loaded with maize, whom we met going towards Dilly. From each of them, the rajah's officer—an official of their own king—demanded a few heads, which after some display of authority, were generally given up. After several acts of this kind, I was surprised to see that those meeting us even an hour later, on catching sight of us a long distance off, darted aside down the first declivity out of our way, and, laden though they were, generally managed to escape. The intelligence of our coming had been conveyed to them from the nearest hill-top the first mulcted people had reached. It is astonishing with what ease and accuracy the Timorese can convey intelligence from one mountain crest to another. Nearly every man carries in his wallet (which he never travels without) a short wooden pipe, by whose curious notes he can convey signal sounds to a long distance; but by the unaided voice they are able, in a series of what seem only demoniacal howls, to hold long dialogues from peak to peak across wide valleys. It was in this way doubtless that our men were nearly done out of their supper, which according to the laws of their kingdom the officer was within his right in demanding.

Reaching about five o'clock a little plateau, known as Erlura, at 3500 feet above the sea, where we found a well and several tall gum-trees with their stems hollowed out by fire, we camped for the night. After seeing the baggage stowed inside the trees, I occupied the time till dark in assiduously collecting the herbaceous plants which dotted the ground. The

district being notorious for robbers, we picketed the horses at dark within a quadrangle of fires—not an unnecessary precaution; for in the middle of the night we heard very suspicious low whistle-calls several times repeated, which gave

SIGNALLING PIPE.

vigour to the "*Alerto!*" of our guard. The Timorese are very clever horse-stealers, I understand, and, by abducting them off from the very side of their owners, the astuter thieves among them have obtained the reputation of being *Swangies*, who have the power of making their bodies invisible.

Next morning at sunrise, after I had taken a round of bearings, we started in a south-easterly direction, continually climbing as on the previous day, along hog's-back ridges and round precipitous gorges. On the bare red clay of Mount Tehula, at 4200 feet, I gathered, with great delight, a new species of *Epacridaceæ* a heath-like plant, which formed interrupted shrubberies all over its summit. From Tehula by a shallow saddle, we reached Kelehoko, 4600 feet, where unhorsing to rest for an hour, I made a most interesting collection of plants, many of them belonging to European families and genera, violets (*V. patrinii*), geraniums, bright azure *Campanulaceæ* on the bare red soil, oxalis, and a new species of Orchids, *Diuris fryana* of Ridley; and near it, among the grass, a new bright species of the *Scrophulariaceæ*, belonging to the genus *Buchnera*. Hence winding down the valley of the Komai, on foot, as the path was very steep and unsafe, we reached about half-way the house-cluster of a native known to my guide, who had been over all this country during various revolts.

As it was beginning to rain, we decided to camp here for the night, and asked to occupy a part of the man's house. To this he replied that his dwelling was at our disposal, but for our own sakes he had rather we did not go inside, as a child of his had been buried only the day before, and he was ashamed of the smell left by the dead body; but we might, if we liked, occupy the platform below the eaves. We accordingly spent the night in this rather cramped situation, completely protected from rain, and in the morning discovered that the whole story of the child's death was a myth; but I have no doubt that we were more comfortable outside, if the wreaths of smoke that oozed through the wicker-work sides of the house gave us any idea of the purity of the atmosphere within.

The Timorese, differing from the peoples of the Indo-Malayan region or of the Tenimber Islands, do not live in villages, but more like the Buruese, in a cluster of family residences, or in isolated habitations often far distant from any other dwelling. This Fatete homestead, a single family abode of one or two houses, was placed in the centre of an enclosure strongly fenced in by high palings made of longi-

tudinal planks and logs of trees intertwined with growing bamboos and thorny shrubs. The gateway was closed by a door of a broad solid slab of wood, swung on its lintels by the two pivots left projecting at the upper and lower corners, and secured by a bar of a slender tree. Just inside the gate stood a little shed, occupied every night by a sentinel on guard, and where I observed a "dummy" head on the top of a pole as a warning to thieves and robbers of the reception that awaited them. Within the enclosure were stockaded wallowing-pools for the owner's buffaloes, and stalls for his goats and ponies in times of alarm, while the ubiquitous pig, his most treasured possession, had its usual quarters beneath the dwelling. The houses were of bamboo, the walls—in which there were no windows—being of several layers of wicker-work matting, raised several feet off the ground on strong pillars. The floor projected some feet beyond the walls all round, forming the platform under the eaves, on which we camped. Their dwellings are not divided into apartments, but there are stall-like divisions, which can be closed by curtains, and are used for sleeping in. A spot is always railed off for the sacred (*luli*) spear, knife and gun, before which the head of the house makes a propitiatory offering to speed his particular undertakings. Outside the enclosure, in the tops of the taller of the gum-trees, were curious miniature huts, which I at first thought, from the absence of any ladder, might be pigeon-houses; but they turned out to be their granaries—reached by climbing the trees—and the depositories of the more valuable portion of their household effects, such as plates, bowls of European make, and cloths. They are invariably placed in high trees whose trunk was divided into four divaricating arms, on which two diagonal planks can be fixed to support a firm floor. They are said to be little subject to the depredations of rats; but they seemed most tempting objects to every prowling thief. It may be, however, that they are protected by the sanctity of the taboo—or, in their own language, are *luli*.

Next day, descending by the usual ditch-like paths and zig-zagging down land-slipped gorges we reached, at 3000 feet above the sea, the bed of the river Komai, a wide channel several hundred yards in breadth, paved with soft blue-black

pebbles and sand, through which instead of one large river numerous small independent streamlets, some of them pure and sparkling, but most of them of a blue inky hue, were meandering their course. A few of these slaty stones were of red or yellowish colour; I myself observed no granite, but my boy brought me a porphyritic nodule. Our way lay down the river-bed, the only good road we had yet traversed, between banks, from 100 to 150 feet in height of perfectly horizontal stratified pebbles, laid down in the bed of some former lake or estuary through which the river, by the slow elevation of the land is now cutting its way. Tall casuarinas, loaded with staghorn-ferns, grew at the bases of these pebbly cliffs and dotted the dry portions of the river-bed.

When we had reached a point 2000 feet above the sea, we left the river, turning to the right up the long steep slope of the Ligidoik Mountain, on whose top at 3400 feet we unhorsed to lunch close to the barricaded dwelling of a sub-chief of the Motaël kingdom in which we still were. Notwithstanding the threats of the official of their own kingdom in attendance on me, we could not succeed in purchasing anything of an eatable kind except some Indian corn for the men, and had to be content with the meagre provisions I had myself brought. Just as we were about to resume our march rain commenced to fall in torrents, compelling us to demand shelter, which was ungraciously conceded to us, as on the previous night below the eaves of a most wretched hovel.

From our elevated position the whole country within the sweep of the eye was of a most singular conformation, being entirely composed of knife-edges, peaks, and precipitous slopes of deep valleys. It surprised me to observe that it was the most inaccessible peaks and isolated crags that were crowned by dwellings, hidden from sight generally among groves of trees. It was easy to see that I was travelling in a lawless land where every man's hand was against his neighbour, and where therefore every man was constantly and restlessly on the outlook.

On the following morning (April 2), after I had taken a series of bearings to all the prominent peaks, we continued our journey south-eastward, descending 450 feet to the Vekélé stream, only to wend our way up again 550 feet to the crest of

Lebetutu, over a bleak, stony, almost grassless country. No sooner had we reached the crest than we began to descend once more—but less abruptly—into the wide valley of the Wai-Matang-Kaimauk. The change to a new set of muscles was at first very agreeable, but ere long I found myself wishing that we were going up, the very reverse of what I was praying for just before we came over the ridge above us. There was no improvement in the road, which as hitherto wound along in an interminable drain, barely wide enough for single file, worn in some places so deep and narrow as to admit only with difficulty our baggage-laden ponies, which, startled by the grating of their burdens on the sides of the defile, were constantly bolting—crashing along headlong, till their panniers were left behind, or themselves jammed fast utterly blocking the way, as the towering mass of the mountain on the one hand, and the precipitous cliffs on the other, or precipitous cliffs on both hands, prevented all passage forwards or backwards. It seems to me impossible for a proper road ever to be made across the island, for, from the mountainous character of the country and the unstable nature of the soil, the best constructed way must inevitably disappear each rainy season. "The land of Timor is always falling," is the natives' own account of the country.

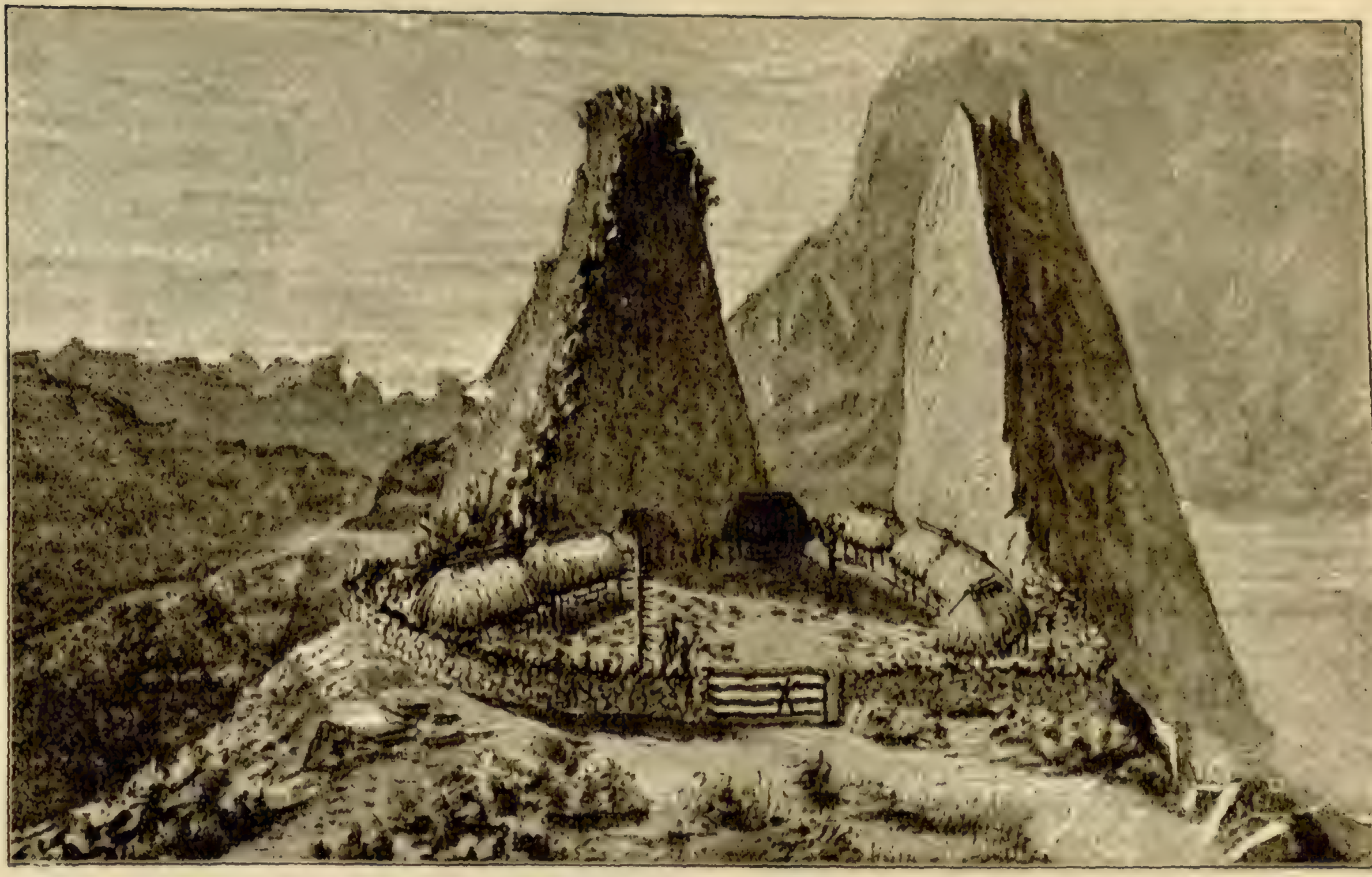
Looking down into this valley, the scenery was of a most singular and striking description. The river was itself the most prominent feature, like a livid blue-black band drawn athwart the landscape, clouding rather than enlivening it; on the further side the mountains, sculptured into peaks and crags, rose so precipitously as to seem insurmountable, while their slopes were disfigured by perpendicular livid blue escarpments thrown down by landslips into the valley; on our own side of the river several giant, wildly picturesque trihedral pillars of rock, all of them of nearly equal height, reared their crags above the level of the mountain slope for some 500 feet. Between two of these great pillars the homestead of the Dato of the Suku of Sauo, was most romantically and enticingly situated, and as it was already late in the afternoon, I decided to claim his hospitality for the night.

Before reaching his homestead I noted at a scented lemon shrub the first butterfly—a *Papilio*—I had seen since leaving

Fatumaba. Indeed, life of all kinds had been exceedingly conspicious by its absence; save a scarlet *Trichoglossus* or a cockatoo flying across our path, and a few crows at Erlura, I had seen no birds, and the vegetation since crossing the Ligidoik river had been very poor indeed. A few casuarinas, acacias, gum-trees, and some rough-leaved *Compositæ* being the only vegetable forms. The slopes on the other side looked somewhat more tree-dotted, however, but the bare red ground displayed itself over a large part of its area. A few hundred yards from the homestead gate we passed a granary-looking hut in the top of a high tree with a number of bundles dangling from its floor. On inquiring what they were, I was surprised to be told that they were dead bodies—folded at the thighs, and wrapped in mats—relatives of the Dato waiting to be buried!

TREE-HUTS WITH DEAD BODIES SUSPENDED BELOW.

Entering through a high-barred gateway, we found the homestead to consist of eight or ten well-built houses of a somewhat different style of architecture from that prevalent near the coast. Surrounded by a high stone wall surmounted by a cactus hedge, and built on a rocky buttress jutting out over a precipitous gorge, it was unapproachable except on the one side by which we entered. When we had settled in the empty guarda to which we were at once conducted by the Dato himself, the first civility and token of friendship that passed between the chief and my Hindu guide, as representing me, was the exchange of siri, pinang, and chalk. Each prepared his quantum, and stuffed it into his mouth, but before adding to it the chalk, of which each had taken the proper quantity



THE STRONGHOLD OF THE DATO OF SAUO.

into the hollow of his hand, "Maman?" (may I eat?), said my guide, with an obeisance, following the proper etiquette, to which the Dato replied, "Maman" (eat). This little ceremony had an instant effect in loosening the tongues of our hosts, who kept up an unbroken dialogue till long after dark.

Just at sunset we were surprised by the intrusion of a man, who beat a long and vigorous tatoo on a drum suspended in the centre of the building, to give, as was explained to us, information to the neighbourhood that the remains of the father and of some other relatives of the Dato—an old white-haired man—which had been dangling some thirty years in the tree-top which we had just passed, were at last to be buried, and that every night till the feast was ready the drum would be beat at sunset. I had observed an unwonted activity of rice and Indian-corn stamping, and remarked the wealth of pigs and goats that we had to make our way through as we entered, all now explained as preparations against the day of burial.

When a member of a family dies, at least three duties are imperative on the surviving relatives before the body can be buried. First, every blood relative without exception is bound to give, either in person or by proxy, a gift of greater or less magnitude to the deceased. On arriving where the dead body is, each donor places his gifts on or near the corpse, and within its hearing fires off as many shots of his gun as he can afford, the greater the number the greater is his respect, it is supposed, for the departed. The other essentials are a death and-burial feast. If the defunct have been a lowly person with few relatives, a small feast will suffice to satisfy the demands of custom. If, however, he have been of some rank, with many relatives and a wide acquaintance, these must be on a scale commensurate with his position; and so serious are the demands that custom requires, that the death feast alone often reduces the family to abject poverty, necessitating the delay of the funeral for months, years, or even a whole century, till such time, in fact, as the relatives and descendants are able to provide the necessary costly feast. The corpse, which has been lying where it died during these first tedious ceremonies, is then folded at the hips, bundled up in a mat and suspended by a cord below the floor of the curious dovecot-like huts in the trees which I have spoken of, to wait inter-

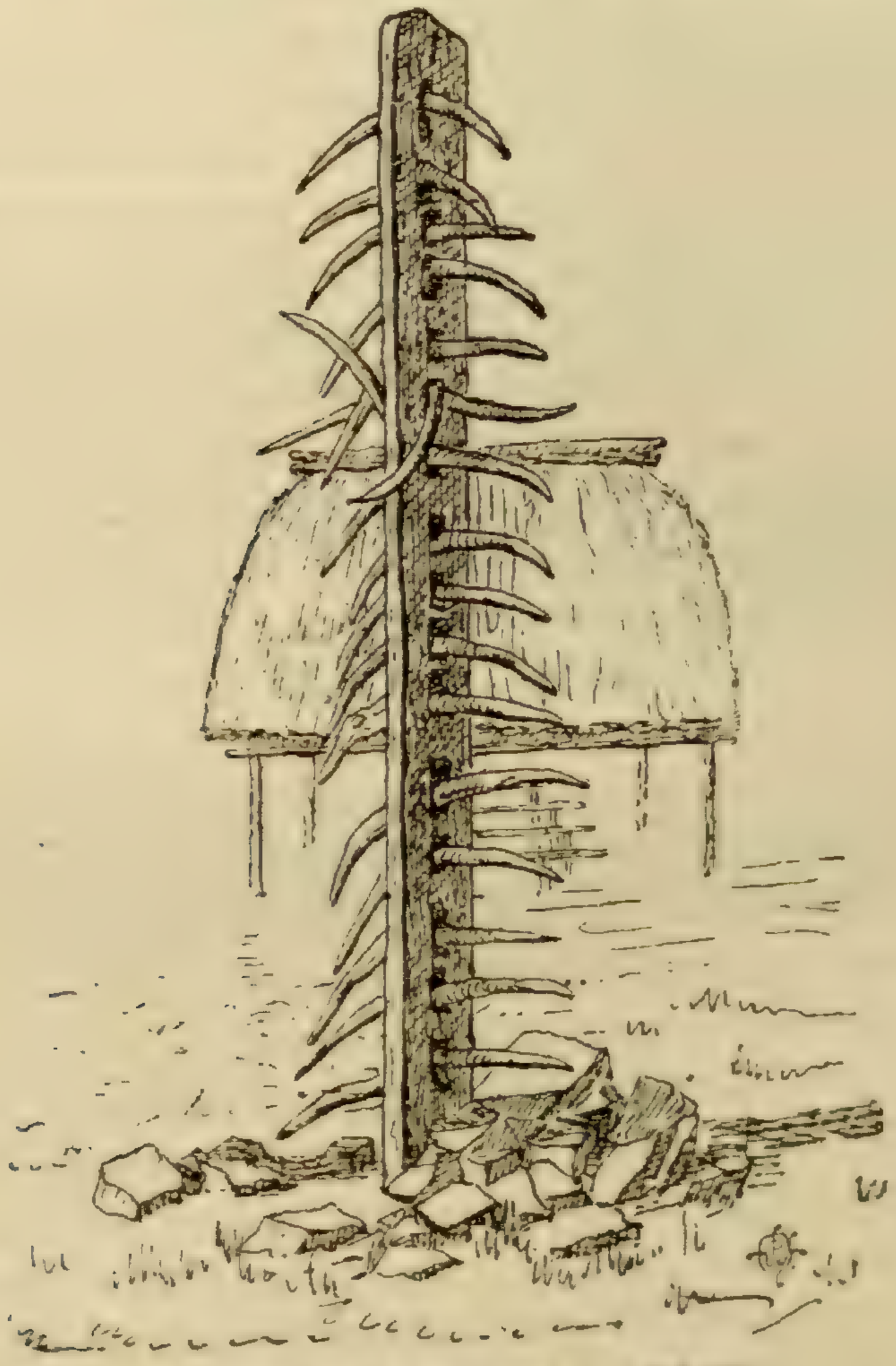
ment; or in some districts it is placed on a bier in a little hut prepared for it near the dwelling of the nearest relative. If a son die before his father's remains have been committed to the ground, the primary and imperative duty of burial devolves on his heir with his other obligations. The knowledge of "who is who" among the various dangling remnants of humanity is handed down from each inheritor to each succeeding heir of the obligation; when at last sufficient buffaloes, pigs, goats, Indian corn, rice, and kanipa for a feast in accordance with the rank of the deceased have been amassed, the body, in such condition as it happens to be, is laid, attired and ornamented in its best garments and finery, in a short wooden coffin dug out of a block of wood, along with the various gifts which the relatives had perhaps decades before bestowed on it, and the whole, wrapped in a "patola," or ornamented cere-cloth, is committed to the grave amid the firing of guns and the wailing of women.

From the time the funeral company arrives, which is generally many days before that actually appointed for the interment, buffaloes and horses, sheep and pigs are ruthlessly butchered to satisfy the insatiable appetites of these savages, who devour it half-cooked, and whose drink throughout the whole period of the ceremonies is confined to the strongest and coarsest arrack. Under the influence of this stimulant the women starting up, and falling into a ring, each beating a round drum, commence to dance, going round and round in a circle, at first slowly, then by degrees faster and faster, till they become thoroughly excited. Shouting and bawling out unintelligible words or sentences, they constantly increase the pace of their prance and the din of their voices, till the men at last becoming excited also, dress themselves in their war feathers and accoutrements, and brandishing their swords, join in the drunken and demoniacal scene, which continues to increase in fury till the wearied-out frames of the performers sink through utter exhaustion, which it often requires, so mad is their frenzy, a whole circuit of the sun to produce. In such a scene the Timorese appear as pure savages.

When these orgies at last come to a close, the skulls and cheekbones of the slain herds are strewn over the ground among the stones heaped upon it at the time of burial; or in

the case of persons of rank or importance the jaw-bones and horns are inserted into holes one above the other in a tall pole, whose number indicates the eminence of him who sleeps below. Such a memento stood within this Sano homestead enclosure to mark the resting-place of the Dato's grandfather.

When a king dies the chief officers of the kingdom are summoned to pronounce that he is really dead. As soon as



GRAVE STICK IN THE HOMESTEAD OF SAUO.

this declaration has been made the whole family, who have till then preserved complete silence, break out into cries and lamentations. For seven days no work is permitted to be done within the limits of the kingdom, no betel or siri may be used, and the people must cut their hair in token of mourning. For weeks and even months the relatives of the defunct ruler continue to arrive, and as each one must view the corpse as it

died, it has become by then a mass of putrefaction emitting a pestilential odour, which to the Timorese gives no apparent discomfort. As during this period whoever arrives must be feasted, every buffalo, horse and pig that the family possess have often to be slaughtered, reducing them to absolute poverty. On the conclusion of these death ceremonies the family leave the house, but the body remains there either on a bier or deposited in a large coffin and guarded by the officials of the kingdom, till the relatives can afford to provide the burial feast. Till such time the king is supposed to be asleep and no successor with reigning powers can be appointed.

Like the Australians, the Timorese cannot understand why any one should ever die unless he be killed; so they attribute both sickness and natural death to the influence of some malevolent existence, which they believe eats up the spirit of the blighted person after death. As soon, therefore, as the sick man has died, the *Swangi* (or person in whom the evil spirit had taken up its residence and who is considered to be in collusion with it), whom their fanaticism easily discovers, used with his whole family to be seized (till it was made a capital crime by the Portuguese so to do), bound hand and foot, and either impaled or buried alive, and their goods confiscated for the benefit of the accusers and the lord of the soil.

Their food seems to consist chiefly of indian-corn roasted over the fire by each individual when he feels hungry, and eaten grain by grain as it becomes ready. On high occasions, when a pig or a goat is killed, the indian-corn mixed with rice and Katjang (*Phaseolus*) beans, is stewed along with the flesh, and the whole mess flavoured with the most pungent capsicums. Sweet potatoes (and in some elevated districts European potatoes), Cucurbitaceous fruits and various herbs form also a large part of their diet. In times of scarcity a species of legume, called by them *kutu* (*Dolichos Lallab*), common over the whole island, is also used as food, but unless it is well cooked it is, if not poisonous, very deleterious. They cultivate few fruits except the banana; but the jack-fruit seems in some places abundant and is highly prized, especially its seeds, which when boiled, taste not unlike potatoes and much resemble those of the seeding variety of the bread-fruit tree (*Artocarpus incisa*). The true bread-fruit I did not

myself observe, though it is said to grow in Timor in abundance.

April 3.—From behind our rest-house, I got a good view of the river below us, where its tributary, the Tahaolat, descending a long steep gradient, and looking from my elevated station like a narrow line of black fluid winding through the centre of its wide, flat and stony channel, dashes down a noisy cataract into but does not commingle for a long way after its union with the paler water of the Wai Matang-Kaimauk, whose bed, judging from the dwarfed appearance of the tall casuarinas growing against the high shingle banks in the fork of their confluence, must be quite fifty feet lower. So broad is the channel of this river that even the conjoint flood—on the way to the sea at Mantutu—meanders like a narrow ribband through it. The grandeur of these streams, if ever their vast beds are filled from bank to bank with a roaring torrent, must be left to the imagination. Guided by the Dato, down the steep and broken slopes to the river margin, 2000 feet above the sea, I had a full view of the giant trihedral blocks down to their bases in a side tributary of the Wai Matang-Kaimauk, and estimated them at not less than 1000 feet in height. The river itself, which looked so small from above, was found to be wide, deep, and rapid, demanding our utmost caution in fording on account of the number of large boulders which were being constantly rolled down by it. I am told that in the rainy season, travellers have often to camp on the bank for weeks waiting for an opportunity to cross in safety; and that many a time horses and men, who in their impatience attempt to force their way, are carried down and crushed by the rolling blocks.

From the river it was a long weary climb of 1500 feet to the summit of the opposite ridge, over a rough shingly ground, from which the soil has been nearly all washed away, so that to raise his little crop of maize the native here has had to build up terraces of low walls in the more sheltered nooks to hold the precious hoard of earth he has laboriously collected behind them. On reaching the summit we were overtaken by a dense drizzling mist, in which, amid the innumerable ravinelets of the descent, each of which looked like the usual ditch-like track of a road, we lost our way. Stumbling up against a

native of the district whom luckily we caught unawares before he could make off, we persuaded him with the offer of a gaudy kerchief to guide us to the Rajah of Turskain's. In his rear we slid and stumbled down on the slippery clay for 1000 feet to the Maukuda, a noisy sparkling stream in a narrow ravine which finds its way to the south coast (showing that we had crossed the water-shed of the country), up which we clambered over boulders and through deep pools for nearly an hour. The sides of the ravine, however, were densely covered with vegetation, and bright with hedychium, balsams, and the French marigold (*Tagetes patula*) so common in our gardens at home, but which was here growing wild far from coast influence or the highways of the world, and was seen by me nowhere else along my route. It is a widespread plant, hailing from Mexico originally, but also found in Africa; but how did it reach the interior of Timor?

Turning to the right out of the stream our horses had to be urged up one of the steepest inclines we had yet encountered, in trenches as deep as their own height, and along more precipitous and dangerous ravines than those we had passed. In compensation for these difficulties the scenery was charmingly picturesque, in the glimpses we got of it through the rolling mist-clouds, and above all, we had entered a more fertile grass-clad region though without much arboreal vegetation beyond acacias and casuarinas. Every foot of the way was dotted with bright herbs in full flower, with violets, white-flowered geraniums like our Herb-Robert in habit, *Galium* very like our common Bedstraw, pink *Labiatæ* resembling the Penny-royal of our English roadsides, *Oxalis*, and *Polygonum*, while among the grass and in rocky nooks grew small terrestrial orchids and the most lovely silver and other graceful ferns; and where the soil was broken by land-slips, and in the ravines, flowering shrubs abounded, so that I mourned that I had not arms big enough to embrace specimens of all I might have gathered. Though we had been climbing up and clambering down—first down 500 feet then up 1700, down 1000 only to rise again the same number of feet—since early morning till past five o'clock in the evening, I quite forgot the steepness of this last ascent (leading up to our destination the residence of the Rajah of Turskain), and my weariness of limb

in the happiness of gathering these familiar forms of flowers, as well as the event of the day to which I had been looking forward, the seeing of the state and bearing of a native potentate.

At last at an elevation of 4500 feet we found in a pretty circular grassy plateau in the hollow of the mountain tops the royal enclosure. The house of the Leorei, a small edifice standing alone, had little to distinguish it from the commonest Timorese dwelling except perhaps the presence of an armed guard housed near it in a little shed, near which stood the "guarda," erected for the accommodation of high personages passing through the kingdom, and therefore assigned to us. This was a miserable edifice raised on poles but not floored except where a rough bamboo platform was erected for baggage and another for sleeping on. It could not have been less comfortable or much more filthy; dogs and pigs had evidently made it their lair, and during our stay they strayed through it at all hours of the day and night while the rain penetrated the roof everywhere, and rushed through below the house as a considerable stream.

Soon after our arrival I sent my corporal to inform the Rajah of my presence in his "guarda," "on the service of the Government," and to request him to come to me and hear the reason of my visit to his kingdom. He sent back his salutation, with the reply that as it was late he would visit me on the morrow and arrange for the necessary supplies of our table and for horses for our further progress; meantime, he begged to send us six eggs and two wax tapers, hoping we should make an endeavour to do with these till the morning, and to say that he had ordered a Cabo of the Reno to take over at once and be responsible for the safety of our baggage that the Rajah of Motaël's men had brought. This official having received over not only every article of our baggage down to the most insignificant strap but ourselves also, placed a guard to attend on us and protect it. It was very amusing to listen to the acceptance on the one side and discharge of obligation on the other—three bundles of paper, two straps, two teapots, three guns, four boxes, two soldiers of Dilly, one Englishman, who has two eyes, a nose, hair on his face, two arms, all safe and complete! Had I come by any accident, or lost any prominent feature of my face, or if any of my baggage

had disappeared, the kingdom would have been bound to replace it in kind, or in value! In this way I never had any anxiety about the safety of my property.

The six eggs (the two tapers included) provided for our bodily sustenance by the Rajah, being anything but sufficient for three men who had travelled through sun and rain for eleven hours, I sent a sharp message that something more substantial must be forthcoming, and at once. From a series of terrible howlings that reached our ears from the royal guard-room, it was evident that my message had been passed on to some unfortunate menial accompanied by an application to quicken his search, which resulted in a fowl and some other comestibles finally being brought.

On the *4th April* I was roused early by a vigorous tatoo from the Rajah's guard-house. The katjeru, or royal drummer, is a hereditary official of high and coveted rank in the kingdom, for they hold that when Maromak made Timor he gave the people a standard-bearer to lead them to war, and a katjeru to walk beside him—"like man and wife."

As the Rajah, notwithstanding the noisy tatoo at his door, seemed to be a very late riser, I set out for the crest of the hill above our camp to take a round of observations. To reach the most convenient place for my purpose I had to pass through a strong barricaded enclosure in which were several apparently closed up and uninhabited houses. It was some minutes before it struck me that I was in the presence of, to me the most interesting of their buildings and their most sacred institution—which I had seen, but without learning anything about, at Sauo—the *Uma-Luli*, a designation which I scarcely know how to translate other than by Pomali House.

I am extremely doubtful whether it is to be reckoned among their really *religious* institutions or not. It has connection with the practice of the *Taboo*, but whether it has been introduced into this island along with a race that migrated from the Pacific, or has arisen *de novo* among themselves I am unable to conjecture. It is just possible that on their own customs they may have grafted an imitation of some of the rites of the Romish ritual, which has now more or less been known to them for 300 years. If a family cluster consists of several houses, there is invariably one among them called the

Uma-Luli ; and near the residence of the rajah there is always one large one, which is the *Uma-Luli* of the kingdom. As a rule, however, the tribal *Uma-Luli* is flanked by two others, or occasionally by more, if the kingdom is large. These edifices almost invariably stand in a cleared space, surrounded by a thick fence, as here within a grove of trees on some elevated spot. Within this fence no twig or branch may be broken or cut, no blade of grass plucked, and no stone overturned under the fear of the vengeance of the *luli ;* no tobacco is permitted to be taken within the sacred boundaries, and no horse or buffalo may stray within it. The buildings themselves are large, carefully built and tended structures of bamboo, raised above the ground on pillars, and possessing two doors, one at the side and one at the end. The *Luli* house can be at once recognised, were it by nothing else than by the buffalo crania with which it is decorated on the outside.

An officer who holds one of the highest, and certainly the most influential position in the kingdom, has charge of the buildings, and presides over the sacred rites which are conducted in them. He is known as the *Dato-Luli,* or *Rai-Luli.* In times of peace, and on all ordinary occasions, an old man or woman lives in the building, as a sort of care-taker; such a person is named the *Luliata.* Sometimes an old man and his wife reside all day in it, but they may not both—being of opposite sexes—remain all night.

It is not very easy to obtain a good idea of the interior arrangements of the *Uma-Luli,* as it is impossible for heretics to get within it, or often very near it. Even natives of Timor who have become nominally *Sirani* (Christian) are prohibited from entering it; but by sedulously questioning those who knew, I was able to gather that of the two doors (whose direction does not seem to be a matter of importance), one is reserved for the *Dato-Luli,* or chief priest, and the other for the persons consulting the fates to enter. By the *Dato's* door no one but himself may enter; it opens into a portion railed off by ornamented wooden pillars from the larger portion of the building, into which the people have entrance. In the smaller part are preserved different articles of veneration—the cranium of a buffalo, a spear, a shield, a chopper, a gun (almost falling to pieces, and of an old, old pattern, my guide told me,

"yet it is more powerful than any other gun, however new"); besides these there is a bag containing the vestments of the priest, which are a broad band of scarlet cloth for his head, a circular breastplate of gold, worn suspended on the neck; two gold discs, about 15 centimètres in diameter, to cover the ears; a broad crown of gold, with two long buffalo-like horns of the same material projecting from it, and gold armlets and earrings. Within this enclosure there is, besides, the most sacred object of all—the *Vatu-Luli*, or stone on which the offerings are laid to the invisible deity. Each of these stones they believe to have been given to the people of Timor for this purpose when the universe was made. In the larger portion of the building there is a fire-place, and vessels and cooking utensils sacred to the use of the *Uma-Luli*.

The different buildings are fitted up in the same way, but only on high occasions is the central one opened. It is kept open during the whole time of war, and in it quarrels arising between the different districts of the kingdom are arranged. In times of flood or of drought or of famine an offering is made to ward off this disaster. If a man has an ordinary sickness in his house, he does not consult either of the larger *Luli* houses, but offers a fowl or a pig to the *Luli*—at a little railed-off portion—in his own house. If he should lose several members of his family, or he be oppressed by any other great distress, he then applies to the priest for permission to speak with the *Luli*. Then, bringing rice with a pig or a fowl, he enters the *Uma-Luli* with the *Dato*, each going in by his own door. When the *Dato* has put on his proper vestments he kills the fowl or other animal, and having placed a piece of flesh from its heart and the side of its head on the *Vatu-Luli*, or altar-stone, he cooks the rest along with the rice on the fire in the *Luli* house. After both have partaken of this food, the *Dato* converses with the *Luli*, and thereafter turning to the applicant he gives him siri and pinang-nut, with the assurance that the sickness will depart or his difficulty disappear. Before planting their Indian corn or paddy crop, they kill a pig or fowl, and both on their own *Luli* stone and on that in the sacred house common to the district, they lay a piece of its flesh.

Their greatest ceremonial, however, takes place on the eve of a war. I shall never forget the graphic description given

me by the guide who was accompanying me, and who himself in a late war had been an actor in the scene, of the selecting by Heaven of those who were to sustain the honour of their country in the field. On the eve of a war, he told me, messengers are sent to every corner of the kingdom and country to summon from wherever he is, and from whatever he is employed, every man who owes allegiance to their Rajah. From the *Uma-Luli* near which we stood, the hill sloped up in a vast shallow, natural amphitheatre, bounded on all sides by precipitous and inaccessible valleys. "Here," he said, "every man of the kingdom assembled, each with a fowl in his hand on which to read his fate, until the whole of this hill was full, sitting close together in silence, each man dressed in his war attire, with his gun on his shoulder, his sword by his side and his spear in his hand; they sat row upon row from the bottom all the way up to the top there, round and round." As he spoke his eyes flashed up, and I could picture to myself the wild and expectant mien of the half-savage crowd. "The *Dato-Luli*," he continued, "then appeared at the door of the great *Luli* house in all the awesome vestments of his office, with the sacred spear and the gun and the shield beside him, and before them all he sacrificed a buffalo. After placing a piece of its flesh, along with siri and pinang on the *Vatu-luli*, or altar-stone, he invoked the spirits of our dead forefathers, then on Maromak of the heavens (in other districts the deity is known by the name *Urubatu* and *Laraũla*, signifying *sun* and *moon*) and on Him of the earth. Then in turn he called out every man present singly, who, advancing to the high priest each with his fowl in his hand, gave it to the *Dato-Luli*, who slayed it in presence of the assembled company. According as the animal dies with its right foot or its left foot elevated, and according as the colour of the siri juice which the *Dato* expectorates on the brow and breast of the man before him is bright scarlet or dark, does the Maromak indicate whether the man is chosen to fight for his kingdom or destined to stay at home and guard the women. If the fowl die with its right leg elevated, and the siri spittle be bright scarlet, the omens are in favour of the consultor, who then, turning from the *Dato-Luli*, draws his sword, and, brandishing it wildly in the air, exclaims—'I'm a Man; I'm a Brave,' and takes his place on

the hillside apart along with the chosen. If the left limb of the fowl remain elevated, or the siri spittle on the brow and breast of the applicant appear of a dark colour he stands rejected, and retires crest-fallen to a place in another group on the left. Those rejected on the first occasion may re-consult the omens a second time; and, if the fates permit them to go to the war, it is probable that they may be wounded, and not impossible that they may be killed. If any man who has been rejected, however, dares to venture into the fight, he will certainly, they implicitly believe, be killed, whereas in the case of those whom the *Luli* has chosen, no bullet or weapon can hurt them. When the number of those who are to fight is complete, their leader is called out before them by the *Dato-Luli*, who, after giving him siri and pinang out of his own mouth to eat, instructs him how to treat the wounded, and to give the dying their last siri and pinang, a supply of which he gives him from that preserved in the *Uma-Luli*."

During war the *Dato* never quits the *Uma-Luli*; his food is brought to him or cooked inside. Day and night he must keep the fire burning, for should he permit it to die, disaster will happen to those in the field which will continue as long as the hearth is cold. He must besides drink only hot water during the time the army is absent, for every draught of cold water would damp the spirits of the people, so that they could not prevail. On their return from the war the *Dato-Luli* goes out to welcome them at the head of all those who remained behind—the women beating musical instruments, and shouting "*Osuai! Osuai!*" to the men who are returning laden with heads.

Their belief in the presence of a supernatural Presence resident in the *Luli*-house is absolute. I was told, with the most perfect belief of my informant in his own statements, that one of the Catholic priests from Dilly, while on a proselytizing mission, having demanded that the *Luli* house should be dismantled and its profane ornaments cleared out, was instantly on his setting foot within the door to commit the sacrilegious act which no one else would dare to do, threatened by the sacred spear, sword and gun in invisible hands, while the altar-stone bounded about through the building so menacingly that he was glad to beat a retreat! When it is necessary to erect

a new *Luli* house, every male in the kingdom must contribute a share of the labour and cost. When it is finished a buffalo is killed to consecrate the building. When this has been properly done, the vestments, the sacred stone and utensils are then carried in, and a second buffalo is sacrificed and portions of its flesh laid on the *Luli* stone. A great feast follows with music and dancing, in which the *Dato-Luli* in his sacred attire, and the rest of the people in their gayest dresses and ornaments take part.

I took advantage of my enforced stay here to increase my herbarium with many of the interesting plants I had seen on our way up from the Maukuda river, obtaining some very rare species, such as *Hypoxis hygrometrica*, *Wollastonia asperrima*, and an *Ophioglossum* fern.

In the evening the Leorei at last arrived to pay his official visit. I had hoped to find the Rajahs of the interior hedged round with some state. I was quite disappointed, for although not without some dignity of bearing, there was little to distinguish him from those about him except that he wore a Malayan sarong, and that his *Täis*, or native-made toga-like robe, was ornamented and fringed with silk, an insignia of royalty. He was not yet *de facto* ruler, for his father was "sleeping" (the long sleep) "in his house," and not yet buried, as there were not yet amassed sufficient cattle and pigs for a royal sepulture. He spoke and read Portuguese with some fluency, and by the questions he asked about the objects of my journey, and in the quickness with which he comprehended my description of the working of an aneroid, a thermometer and a prismatic compass that I showed him, he exhibited an amount of intelligence that rather surprised me. *Why* the magnetic needle turned always to the same point puzzled him beyond measure, and I could see that my reply, that Maromak made it so, was not altogether satisfactory to him.

Like most of the Rajahs, who in their periodical visits to Dilly have been brought into contact with, and influenced by the Catholic priests, my royal friend was a professor of their faith, as well as a follower of the pagan rites of his own people; and to see over against the *Luli* temple, a lone and uncomprehended symbol of the Christian faith in front of a small, neglected bamboo edifice representing a chapel of its worship,

could not but raise strange reflections in the breast of a European traveller.

As still another day of waiting for the horses for the continuance of our journey—to the kingdom of Bibiçuçu—had to be passed here, I was not disappointed at the opportunity thus afforded of increasing my herbarium along the slopes of Rusconna, whose summit commanded a view of both seas —the *Tassi-feto* or female sea on the north, and the *Tassi-manni* or male sea (as the natives have named them), to the south—and of the peak of Kabalaki, the highest mountain of all Eastern Timor. The mountains of Turskain were everywhere covered with a rich carpet of green grass, which gave them a most pleasant and fertile appearance, and on which thousands of sheep might be pastured with great profit.

CHAPTER III.

IN THE KINGDOM OF BIBIÇUÇU.

Leave for Bibiçuçu—Bridles—A trio of Braves—War and its attendant ceremonies—Rahomali—Luli ground—Bibiçuçu—Harvest-fields—Cultivation—Take the law into my own hands—Connubial relations—Waterfall—Birds—Herbarium—Disquieting news—Mount Kabalaki—Move forward to Saluki—Native market—Description of natives seen there—Ornaments—Dyes—An enraged Timorese—Red-haired race—Timorese a mixed race—Up the Makulala River—Gold—Ceremonies of gold-gathering—Arrive at the Rajah of Saluki's.

Friday, April 6th.—At daylight began the loading of the horses and men; but finding that the herbarium gathered at Turskain would from its size hamper our progress very much, I had it packed up and sent by special messengers to Fatunaba to A. About seven o'clock we got under weigh for the Rajah of Bibiçuçu's by a south-east course towards the sharp peak of Tahaolat. The horse I now rode was furnished with a native saddle, composed of long pads on each side of the spine, secured by cords instead of bands, and with neat wooden pulleys in place of buckles. The Timorese in riding place only the great toe in the stirrup, consequently these were merely little blocks of wood at the end of a cord, with a hole for the insertion of the digit; or, often more simply still, a small wooden disk for the support of the first two toes, between which the stirrup cord is grasped. The bridle-bit—a fearful instrument of torture from the sharp spikes with which it was armed—was of brass, of native manufacture and good workmanship, cast, as I was told, in separate pieces in a mould of wax, lined with very fine clay.

On one of the hill-tops on our way we passed three men who had come from a neighbouring hut to see our cavalcade. My servant, who was a native of the kingdom we were approach-

ing, gave and received from the group a hard stare; but no words were exchanged. When we had gone a little way, he looked back at the group. "These are Braves," he said, after a little, with somewhat of admiration, I thought, in his tone.

"Indeed!" I said, "how do you know?"

"The tallest of them," he replied, with a coolness that astonished me, "cut off my father's head in their war with Bibiçuçu."

"Do you not feel any rancour towards him? Don't you wish to have it out with him now?"

"Oh, no! the two kingdoms are now at peace; each has given back the heads they took, long ago."

The custom of head-hunting, as carried on among the wild tribes of Borneo, is not practised among the Timorese except during war, which is begun after the most explicit declaration.

When a raid by one tribe has taken place on the fields or herds of a tribe in a neighbouring kingdom, a messenger is sent with the intelligence to its Rajah. If the rulers of the two kingdoms are united by the ordinary ties of friendship, or by the sanctity of the blood-bond, the affair is settled after long parleys and discussions, by the payment of an agreed-on price. Kingdoms related to the belligerents by ties of marriage or sworn brotherhood usually send a contingent to assist in the war, or a kingdom may hire men from a neighbouring or friendly power. If any of these are killed they must be redeemed by a large sum, so much for the eyes, hair, mouth, nose, and for every limb and organ of the body, much after the custom of reckoning the value of a man in vogue in the island of Buru or among our own early ancestors. "The freeman's life and the freeman's limb had each on this (bloodwite) system its legal price. 'Eye for an eye,' ran the rough code, and 'life for life,' or for each fair damages."

If no goodwill exist between the two kingdoms, no satisfaction will be obtained. War is prepared for, and by the sacred rites described above the men who are to sustain their cause in the field are selected. At length, when the armies meet, a last discussion of the question is held by a representative of each side who advances in front of the respective armies. If no agreement is come to the fight begins. Being really of a very cowardly spirit, they never fight in the open but from behind

trees and crags. Hostilities are carried on mostly by the offensive army pillaging and ravaging all they can lay hands on, robbing every undefended dwelling, ruthlessly decapitating helpless men, women, and children, and even infants.

In most districts all the warriors fight on foot; but the Lamkitos, who live between Allas on the south coast and the great mountain of Kabalaki, fight from horseback with their legs tied under their horses' bellies, so that, in case of their being wounded or killed, they may be carried back to their own village with their heads on their shoulders.

When one of their number has fallen, sorely wounded or killed, there is in general a grand stampede of all his companions. The valiant marksman rushes forward, and, standing over his fallen foe, calls out to his friends, "Ho! what is the name of this man?" His friends call back, "Ho! that is so and so;" to which the response is, "Know, then, that I am so and so," and, lifting up his enemy's head by the ear or the hair, he decapitates him at a blow. He carries off the head in triumph, retires to his own house, and sets about preparing and preserving the head, by removing the brain and drying the flesh and skin before a slow fire. He never washes his hands till he returns with the army to its own capital, when those who come back carrying heads are saluted by the women, who along with the *Dato Luli* have come out to meet them with music, with the cry of *Oswai! Oswai!* ("Braves! braves!")

For every head the fortunate warrior brings back he receives a present from the Rajah, and a circular disk, or *lua* of gold, which he henceforth continually wears round his neck —a Timorese Victoria Cross. The captured heads are carefully preserved by both sides in the conflict, till such time as amicable relations can be established between them, when a general assembly of the two kingdoms is held whither the heads taken in the war are brought also, and amid terrible howlings and lamentations they are restored by each side to the relatives of the deceased. Each "Brave," in giving up the head he has taken, gives a small gift to the relatives that friendship between them may be restored, which is cemented by, as usual, a boisterous feast, concluded by heavy drinking, and the wild dancing of the *Tabédu* already described. The recovered heads are now placed with the unburied members,

which can then obtain sepulture. Every head is invariably forthcoming at such a peace-making, otherwise amicable relations could scarcely be restored, certainly not without a very heavy price for the missing skull.

The ceremony of blood-brotherhood alluded to above, or the swearing of eternal friendship, is of an interesting nature, and is celebrated often by fearful orgies, especially when friendship is being made between families, or tribes, or kingdoms. The ceremony is the same in substance whether between two individuals or large companies. The contracting parties slash their arms, and collect the blood into a bamboo, into which *kanipa* (coarse gin) or *laru* (palm-wine) is poured. Having provided themselves with a small fig-tree (*halik*) they adjourn to some retired spot, taking with them the sword and spear from the *Luli* chamber of their own houses if between private individuals, or from the *Uma-Luli* of their Suku if between large companies. Planting there the fig-tree, flanked by the sacred sword and spear, they hang on it a bamboo-receptacle, into which—after pledging each other in a portion of the mixed blood and gin—the remainder is poured. Then each swears, "If I be false, and be not a true friend, may my blood issue from my mouth, ears, nose, as it does from this bamboo!" the bottom of the receptacle being pricked at the same moment to allow the blood and gin to escape. The tree remains and grows as a witness of their contract. It is one of their most sacred oaths, and almost never, I am told, violated at least between individuals.

If a member of a family of a king marries into that of another, the two kingdoms often swear friendship, and when the one is at war the other is bound to send men to aid him. One brother coming to another brother's house is in every respect regarded as free, and as much at home as its owner. Nothing is withheld from him; even his friend's wife is not denied him, and a child born of such an union would be recognised by the husband as his. In speaking of the Greenland Esquimaux, Egede expressly states that they were reputed the best and noblest-tempered, who, without any pain or reluctance, would lend their friends their wives.

Ascending by a very steep path, bordered with *Mitrosacme*, hare-bells, geraniums, wood-sorrel and some liliaceous plants, we reached the top of Rahomali at 4700 feet, whence a

LOOKING TOWARDS CAPE LUCA, FROM BIBIÇUÇU.

magnificent view lay before us of an immense tract of country between both seas, riven and ploughed up in the most gigantic manner, not an acre of level land being visible anywhere save by the margin of the seas, and in which every isolated peak and crag was capped by a dwelling. Having halted a short time to survey the scene, I observed that the sky was becoming overcast, and gave orders to the men to move on briskly in advance, as I feared it would rain. My boy turned sharply and besought me, "Oh, master, do not say that word!" (for rain); "these mountains are not good, and if you say that word here, we shall certainly be overtaken in a storm." The incident recalled to me a like dread of certain mountain-tops exhibited by the natives in Buru.

Hence our course lay almost due south right over the peak of Tahaolat—rising up to 6000 feet; but its impracticable crags necessitated our making a descent of 2000 feet by a spiral track round half its girth, in the face of an almost perpendicular slope, from which radiated many deep and inaccessible ravines, clothed, I could perceive, with a dense and interesting vegetation of *Lauriniæ*, *Ericaceæ* and numerous small epidendric orchids and Lycopods.

Where the spur of Tahaolat commenced to rise towards Mount Ailor—4200 feet—I rode close past a pond full of ducks of the species *Tadorna rajah*, whose very tameness and utter disregard of us might have told me, even if I had not been carefully warned, that they were on *Luli* ground, where I dare not shoot; even the scarlet *algæ* covering the surface of the water, it was sacrilege to touch. A long and gradual descent brought us at last to the Rajah's of Bibiçuçu, where we were assigned a guarda on a windy bluff at 3200 feet above the sea, commanding a view of the whole country along the southern coast from beyond Cape Luca in the east to far past Allas in the west, its low littoral grooved by broad blue-black river-beds margined with casuarinas. Within the neighbouring kingdom of Manufahi the Peak of Kabalaki, with its rugged battlements and beetling crags, reared its majestic summit over 10,000 feet into the air. The whole region was hewed up into narrower and more precipitous valleys than any I had yet traversed—features awesome and imposing, but with little to commend them to a kindly place in the affections.

I was struck by observing that the roofs of the houses about me were surmounted by an ornament (see opposite page) closely resembling that found on temples in Fiji, as shown in Stanford's 'Australasia,' which may perhaps be an indication of some relationship or communication in former times with the Polynesian races. In one of the baskets which I obtained in the Tenimber Islands, the lid, which was hut-shaped, culminated in an ornament of the same form.

The Rajah himself was absent, and we did not receive a particularly pleasant welcome from the *Rajah Katuas*, who was acting as his substitute; but, desiring to live on the best terms possible with this kingdom, where I hoped to make a prolonged stay, I overlooked as much as possible his conduct. From what I had learned of the district from my boy while still at Fatunaba, my curiosity and interest were excited, not only in its flora and fauna, but in the curious customs that prevailed among the people of this rarely visited and little known region.

In travelling south, after crossing the Kaimauk river, a considerable change is observable in the flora. The *Melaleuca* greatly diminishes in numbers, while in the ravines Casuarinas, Urostigmas, and species of *Ficus* become more abundant; and Acacias, aromatic *Labiatæ*, shrubby *Malvaceæ* and *Melastomaceæ* cover the more exposed slopes, where also clumps of tall, dark foliaged bamboos, with graceful nodding plumes, form quite a feature in the landscape. Whenever considerable patches of trees have attained the dignity of a wood, one may be sure that there the land is *Luli*—sacred territory—where, if he is permitted to enter, the botanist may not break or cut a single branch. These spots—often the highest peaks of mountains—having been *lulied* for generations, must be the richest storehouses of all the rarest plants and trees in their localities.

How aggravating to the spirit it was to be prevented from collecting there it is needless to describe.

My collecting was often enlivened by the sound of happy singing from the fields, which on all sides were during my stay in the height of the rice harvest, here as in all other lands a season of mirth and rejoicing. In the harvest-field every one—old men, women, and children—comes out to help. The older people in the centre of a long line, with the youths on

HOUSE-CLUSTER IN THE KINGDOM OF BIBIÇUÇU.

to see that I was properly attended. His instructions, however, were neglected the moment he turned his back and left the direction of affairs to his old uncle, who acted as Viceroy. The kingdom was by their custom bound to supply me with provisions, each family having one day's rations to provide and deliver at our guarda. As the people lived so widely scattered, they often managed to shirk their duty, leaving us utterly without anything to eat. I would far rather have purchased provisions; but no one would sell or desired to sell. Out of their scant stores they grudgingly gave what they were ordered to give, and had they accepted any price for it, it would have been claimed by the Rajah.

On one occasion, after having gone without a particle of food for a whole day, even after appeal and threats to the Viceroy, I took the law into my own hands by shooting the first large fat pig I encountered. It was the property, as it luckily turned out, of the Rajah himself. I say luckily, for I would rather that his herds were plundered than his people's, and because this simple act disclosed for me a curious law of their country. By the fault of some member of this community my act had caused this loss to the Rajah, a wrong which had to be expiated by a fine levied on all the Sukus of the kingdom, not on the offending individual alone.

In the early days of our own history, "the price of life or limb was paid, not by the wrong-doer to the man he wronged, but by the family or house of the wrong-doer to the family or house of the wronged. Order and law were thus made to rest in each little group of English people upon the blood-bond which knit its families together; every outrage was held to have been done by all who were linked by blood to the doer of it; every crime to have been done against all who were linked by blood to the sufferers from it. From this sense of the value of the family bond as a means of restraining the wrong-doer by forces which the tribe as a whole did not possess, sprang the first rude forms of English justice. Each kinsman was his kinsman's keeper, bound to protect him from wrong-doing, and to suffer with and pay for him if wrong were done." *

This incident is one which well illustrates how near a traveller seeking for information of an abstract kind, may be

* Green's 'History of the English People,' page 3.

to missing some of the most characteristic and interesting of the laws and customs of a people, and how only by a lucky chance or mischance in the most unexpected way he may light on fundamental facts of their history.

I was fortunate enough to gain also much information about the curious connubial relations prevailing in this part of the island, which recall the husband-clans and wife-clans existing among some of the Australian tribes.

To the west of Bibiçuçu lies the neighbouring kingdom of Manufahi, and to the south-west that of Allas. The men of Manufahi cannot *purchase* wives from Bibiçuçu, but the men of Bibiçuçu can obtain wives by barter from Manufahi. The women of Bibiçuçu can obtain husbands from Manufahi, if these men come and live during the lifetime of their wives in the kingdom of their wives. No *purchase*-money may be paid, and none may be accepted for them. The son of the Rajah of Manufahi may marry the daughter of the Rajah of Bibiçuçu, but he cannot on any condition obtain her by purchase, nor may she settle in Manufahi; he must remain in Bibiçuçu during her lifetime.

Saluki and Bidauk are two districts of the kingdom of Bibiçuçu. A man of Saluki may marry a woman of Bidauk, and take her back with him to Saluki; but he must purchase her, and it is not in his option to remain in Bidauk with his wife's relatives instead of paying for her. On the other hand, the men of Bidauk can marry with the women of Saluki; but the man must go to Saluki and live in the house of the woman, and he has not the option of paying for her at all. The children of the union belong to her, and on her death inherit all her property, while the husband returns to his own kingdom, leaving the children behind him, except in the case of their being more than two, when he is entitled to claim at least one. This is possibly the remnants of matriarchal descent. These restrictions, however, do not hold with a man of Saluki if, for instance, he select a wife from a kingdom which is not related in this curious way to his own kingdom; also, as far as I am able to learn, Manufahi men may take wives from Allas—or Allas men from Manufahi—on paying the ordinary price demanded in these kingdoms for a wife, without incurring any restriction as to residence. The

Timorese apply the name *Vasumanni* to the husband-giving, and *Fetosau* to the woman-supplying clan.

In Timor monogamy is the rule; concubinage is also practised; but rarely otherwise than among the Rajahs and chiefs. The wife of the Rajah—his concubines may be whom he will—must be the daughter of a royal house, and is selected by the people of the kingdom from among the best-looking daughters of some neighbouring Rajah. When an agreement has been come to as to the price of the bride between these people or their representatives and the father of the girl—always with the consent of *her* father's people—the suitor-kingdom sends a deputation to stay and be, as it were, a guard over the prospective mother of their future king, till the price—always a large sum, often as many as two or three hundred buffaloes, along with herds of horses and goats, of sheep and pigs, of gold in dust and gold manufactured, with piles of native cloth—has been paid. When the money and gold portion of it has been sent to the father of the girl, the future husband is invited, as a rule, to his father-in-law's, where, after a great feast, at which hundreds of buffaloes are killed, the girl is handed over to her lord and master to be conveyed to his own kingdom. A large escort of her father's people convey her to her new home, where, as long as any part of the price is unpaid, they remain guests, as a daily reminder to the Rajah that the balance is still to pay.

If the Rajah have a son, he succeeds his father. If he have daughters only, the eldest becomes Rajah *in esse*, whose active duties are performed by a lieutenant, and the others may become the wives of neighbouring Rajahs. If no Rajah offers for them, they may not be married to any one not of royal descent, with the exception, perhaps, and that very rarely, of some of the highest officers in the kingdom.

The people of the kingdom choose their queen's husband. Having fixed their choice on a suitable person in some neighbouring kingdom, they send a deputation to request the permission of its Rajah and people for one of his sons to become the husband of their queen. If the proposal is agreeable to them, the selected youth is conveyed to his new kingdom, receives its queen as a gift, and is endowed with the status and rank of a nominal Rajah. He must remain in his new

VIEW IN THE SERRATA VALLEY, BIBIÇUÇU.

kingdom as long as his wife is alive, and his children belong to the kingdom of his adoption. If, however, there are more children than two, a boy, or a boy and a girl, belong to the husband, and are at liberty to return to, and are in fact claimed by his father's kingdom, and are the inheritors of his property, while the rest are heirs of her's. When the queen dies, her consort returns to his father's kingdom, but he can take with him nothing from his wife's home; everything there belongs to her children. If he die first, his body is carried to his own family burying-ground; but I am not sure by whom the death-and-burial feasts are provided.

If the Rajah of Bibiçuçu, for instance, have no children, the people of his kingdom beg the services of a son always of the Rajah of Manufahi, as their Rajah, for the payment of a certain sum to his kingdom as hire. His new kingdom then purchases a wife for him, if he be unmarried. Should the kingdom of Manufahi lose all heirs to its throne, it may demand back again the reigning Rajah of Bibiçuçu. If he has children while Rajah of Bibiçuçu, or afterwards, they belong to the kingdom which purchased for him his wife, with the reservation just mentioned, of a boy or a boy and a girl to become his heirs. If, however, the kingdom of Bibiçuçu has *bought* and not hired merely the son of the Rajah of Manufahi, he cannot be recalled on a vacancy occurring in his own father's kingdom.

In the sunny valley of Serarata, near a picturesque waterfall, butterflies, chiefly of the common families of *Pieridæ* and *Lycænidæ*, were abundant, and formed all along the water's edge quite a border of bright colour. Bird-life was far scarcer than nearer the northern coast, but along the more wooded flat lands by the southern shores, the natives informed me that they are very plentiful. A lively little Pipit (*Anthus medius*), with the perfect habits and call of a Wagtail, frequented the barer grass fields in flocks, while among the shrubberies a pretty *Cisticola* which I first took to be a wren, and a black Fantail Flycatcher (*Rhipidura rufiventris*), flitted about with the restless habit of their tribe. A bright orange *Pachycephala* and a species of Tit (*Parus timorensis*), which I did not obtain, were not uncommon. On the trees the white-headed Fruit-pigeon (*Ptilopus cinctus*) sat motionless during

the heat of the day in numbers, on well-exposed branches; but it was with the most extreme difficulty that I, or my sharp-eyed native servant, could ever detect them, even in trees where we knew they were sitting. The peculiar coloration of the plumage of these birds in the hand or in the cabinet is so conspicuous and striking that it would scarcely be believed that they can occupy leafless branches (if there be foliage behind and above them) with the most perfect safety from detection. Neither the kakuak (*Philemon*), the oriole, nor the cuckoo (*Centropus*), which were so conspicuous among the trees and shrubs around Fatunaba, were observed at Bibiçuçu.

My herbarium, however, made more rapid increase than any of my other collections, and every day I gathered plants rare or unknown in any European cabinet, to which perhaps the handsomest addition was a large climbing species of *Artocarpeæ*, with the chastest possible foliage, which coiled itself in regular spirals about the bole of a tall tree. Its stem was studded with figs in all stages of growth and of almost every hue, from richest purple-lake dotted and blotched with pure chinese-white, to light red or brilliant scarlet speckled with the deepest orange; others again, when gathered and laid in a heap on the ground, might have passed for the eggs of some of the Pheasant or Grouse families.

On the 20th of April the horses returned from Fatunaba, bringing me the botanical drying-paper of which I was so much in need; and in corners of the baggage, where A. had mindfully thrust them, I found welcome additions to my table, which could not have been spared, however, I knew, without pinching the meagre Fatunaba larder; and among which I found a note with the evil and disquieting tidings that our house had been attacked in the night and plundered of nearly all the stock of trade goods and other valuables that it contained by the treacherous hill-men, who had taken advantage of her defenceless condition. She bravely said nothing of being afraid, so I could only hope that the anxious fear—more trying than the danger of the moment—of further visits from them might not in the oppressive stillness of the night in her unprotected hut, prey on her nerves not then fully recovered from the severe strain of that short but trying scare of a Kaleobar attack in Timor-laut.

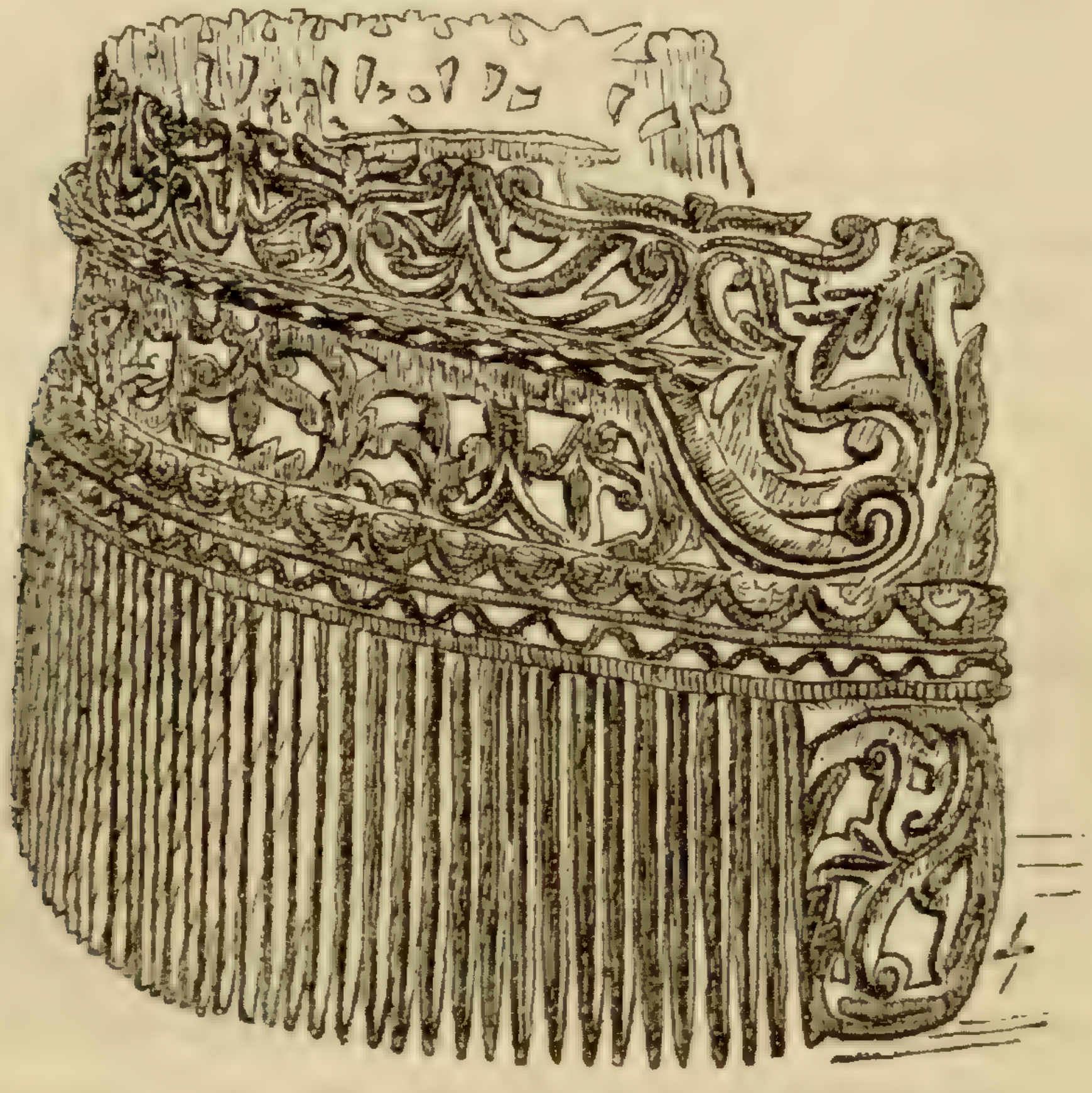
I retained the porters and horses to convey me next day to Saluki, on the other side of the valley of the Makalaha, where I had arranged to go, not without great disappointment; for every day then would be taking me farther from Kabalaki in the Manufahi kingdom, which I had wistfully gazed at so long, and whose summit must support a flora the most interesting of all Eastern Timor. My Hindu guide, however, refused the responsibility of conducting me thither, not only because of the Lamkito robbers who skulk in the long grass at its base to pick off and rob all passers by, but also because war was on the eve of breaking out between the two kingdoms, which would prevent any Bibiçuçu man from accompanying us.

In leaving Bibiçuçu I made a detour from the shortest way, attended by a high official of the kingdom, to the bed of the Makalaha, which was reached by a steep winding descent of 1600 feet, as I was very anxious to see the weekly market of the district, which was held under the Casuarina trees there.

As soon as my approach was observed a loud screaming from the women and children spread an alarm resulting in a stampede of the entire concourse. The officer accompanying me dashed among them, shouting and reassuring them that I was only passing by, and was in no way going to meddle with them. Meantime I had sat down under the shade to place in paper the plants I had gathered on the way down, without lifting my eyes toward them, and as quite unconscious of their presence there. By slow degrees, first one, then another and another, enticed like so many monkeys by curiosity, crept in about to see the, to them, strange performance, and as I differed little from an ordinary human being they forgot their fright, and in a little while the market was proceeding in its accustomed way, through which I then strolled quietly with open and interested eyes.

There were between two and three hundred people congregated—a wild and savage-like crowd. The men were dressed in little more than the ordinary T-bandage or *hakpoliké* of native make, about their loins; some, but not all, of them had a kerchief girt about the head, while their hair was twisted into a knot on the top or back of the head, or combed

out into a crimped or semi-frizzled mop. Every man wore suspended over his shoulder a *tais* or plaid, which differed in ornamentation and excellence of manufacture according to the district in which it had been made. From his shoulder-knob depended his coï, or wallet, the cords for whose opening and closing were elaborately strung with circular disks of shells alternating with dice-like beads of bone richly carved. In this is carried a store of betel-leaves and pinang-nut, with tobacco and other chewing necessaries, and the universal bamboo drinking-cup in case in his travels he should meet



ORNAMENTED COMB.

some friend or acquaintance who has a supply of palm-wine (*laru*) or of *kanipa*, as they name the coarse gin imported by thousands of cases every month into the country.

Every man was armed with a spear and a long knife, and if he had not a long Tower flint-lock over his shoulder, he grasped a bow and a handful of arrows, light shafts made of the tall canes that grow everywhere in the island, tipped with poisoned bamboo barbs. Many of them carried besides a buffalo-hide shield to ward off the stones which, suddenly enraged, they are in the habit of discharging—and with

wonderful power and accuracy—at each other. Most of the men had round the waist ammunition pouches of thick buffalo-hide, in form much like European cartridge-belts, with compartments for the small bamboo cylinders in which they keep gunpowder, shot, flints, balls of lead or of ruby crystals gathered out of the river beds; here and there a man from the western kingdoms of the Portuguese territory could be told by the excellence of the construction of these accoutrements, and the elegant way in which they were studded with large tin-headed nails, or with rows of Dutch silver coins, and occasionally with an English sovereign among them transfixed by a nail through its centre.

The women wear very few ornaments—a few arm-bands of silver or horn, and occasionally earrings, and, transfixing the knot in which their hair was gathered behind, a high semi-circular comb, elaborately carved in beautiful and complex patterns. These are said to be given by the youths to their sweethearts, and possibly represent a sort of engagement token. Their dress was a simple tunic, the *taisfeta*, hung from the waist or from the armpits to the knees.

The women did all the selling and buying, while the men strutted about exchanging with each other drinks of palm-wine—to which they are inordinately given. Besides the different food stuffs, there were exposed for sale on the ground, piles of those beautiful cloths, entirely spun and woven by themselves, in which both between themselves and among the surrounding islands a large trade is done, and cigarette and tobacco holders exquisitely woven out of thin shreds of palm-leaf, on which are worked in additional fibres most artistic coloured designs in yellow, red, and black, of dyes made also by themselves; the red out of the nut of the *Morinda citrifolia*, the yellow from the epidermis of an epidendric orchid called *suaik*, and the black (or dark blue) from the indigo. The favourite and typical carved ornamentation that I observed on their weapons and accoutrements, and

J.B.G.

ORNAMENTATION ON SMALL BAMBOO. $\frac{2}{3}$

engraved on the pipe figured on p. 429, closely resembles that on some of the ancient British remains found at Taplow in 1882. Another pattern is represented on page 463.

I was told that rarely a month passed without once, or oftener, the market being suddenly broken up by a drunken brawl, as few of the men ever leave it sober.

I myself witnessed the preliminary blaze of passion in a fiery spirit who, aggrieved in some way, had sought his foe in the market-place, whither he had come, however, just too late to find him. It was a sight to remember—the flashing eyes and passionate mien of that wild savage, the hasty and significant look at the priming of his flint-lock, as he dashed away in hot pursuit (a wild cry being passed down the valley to the pursued), bounding from rock to rock in the river bed like a chamois, his coï and long knife dangling by his sides, and his tais flowing out behind him with the fleetness of his pace. I watched him till he disappeared behind a bend of the river; but I never recall the features of the man without wondering what was the issue of that passionate chase.

They are a vindinctive people, without a vestige of pity, as might be expected from their having always had the dealing out of punishments for wrong done to them by their own hands. A man I knew, whose neighbour had by accident (or design) killed his pig, failing to obtain the restitution he demanded, seized his neighbour's child and ran off with it, holding it on his shoulder as a shield against the father should he wish to fire on him, and carried it to the coast, where he purchased a horse with the proceeds of its sale. I do not know certainly, but I am strongly of impression, from what I know of the character of the people, that the *vendetta* exists among them.

While in the act of turning from watching this human hunt to continue my journey my eye lighted on an object that riveted my interest more than all else among these savage marketers—a red-haired youth (first one, then a few others), some with straight, some with curly hair, with red eyelashes, blue eyes, and the hair over his body also reddish. I found, on inquiry, that a little colony of them, well known for their peculiar colour of hair and eyes, lived at Aitúha. at no great distance off. Though they lived in a colony

together, they were not shunned by their neighbours, who even intermarried with them. The offspring of these unions took sometimes after the one, sometimes after the other parent.

In looking eagerly at their faces I saw more than their features only; their presence there was an excerpt out of a long history. In imagination I saw past them down the dim avenues of Time—a far far cry—to their early progenitors, and pictured their weary retreat, full of strange and romantic vicissitudes from a more northern clime till forced off the mainland by superior might, into exile in this remote isle, where as a surviving remnant amid its central heights, they

FIG. 1.

FIG. 2.

NATIVES OF BIBIÇUÇU.

are living united but not incorporated with the surrounding race whose pedigree has no link in common with their own.

What the pedigree of the Timorese is I have not sufficient evidence for forming any decided opinion; but that they are a race in which many elements commingle seems certain. I saw no one with what I can with perfect truth designate as "black skin" such as seen among the Aru islanders. Tall, well-proportioned men, with frizzly hair, and of a rich yellowish brown or of a chocolate colour, I saw in abundance, as well as short, stumpy men, with straight hair on the head and with no lack of beard and moustaches. Mr. Earl * has also noticed the "great differences exhibited by the peoples of the tableland above Dilly. Some of the natives have a dull yellow colour; the parts exposed to the sun are covered

* 'The Native Races of the Indian Archipelago,' 1853, p. 179.

with light brown patches; the hair is straight and thin, and its natural colour reddish or of a dark chestnut brown. There are also found in Timor all intermediate shades of the skin, from dark yellow to black or chocolate brown, and the hair from red and straight to the short and woolly (in another place, 'short-tufted') hair of the Papuas." As in Timor-laut, I believe we have in Timor a mixture of Malay represented perhaps in such faces as Figs. 1 and 2, Papuan (Fig. 3, p. 466), and Polynesian (Fig. 4, p. 466) races. The accompanying figures, sketched from one kingdom, will show this mixture better than volumes of description; they are the portraits of

FIG. 3.

FIG. 4.

NATIVES OF BIBIÇUÇU.

people taken at random from those constantly about me in Bibiçuçu. The colour of skin, form of head, features of face, character and distribution of hair I met with in every variety and amount of commingleement.

In the eastern extremity of the island the people, I am told, resemble Malays, and they speak the Malay language. Among the Fatumatubia Mountains—I have it on the, as I believe, excellent authority of one of the commandants of the district—lives a race of dwarfish people, speaking a "language" of their own. Their dwarfishness consists not so much in the dimensions of their bodies, as in the shortness of their limbs which are thick and strong. They live among the rocks, are great robbers and much detested. The men wear only the

T-bandage; while the women go absolutely naked, and when they appear to trade with other than their own people they ensconce themselves in baskets up to the arm-pits. These people may possibly be Négritoes.

From the market-place our way lay up a most pleasant naturally macadamised road in the river bed by a very gentle ascent. The cliffs, of loose shingly horizontally-lying water-worn detritus, which banked it in on both hands, rose perpendicularly often to 200 feet, through which in many places elbows of strata at right angles to the direction of the river protruded forming as it were a series of deep pockets, in the debris of which especially where there are largish boulders among it, is found the gold of which this river is said to contain more than any other in East Timor. The gold is most abundantly found in pockets beneath which strata dip as to form as it were a floor, the *futu-viti*, the "mat (*i.e.* bottom) rock" of the native. The sources of this river, to which no one may approach without first sacrificing a pig or fowl, are most rigidly *Luli*. Only in one month of the year, when the river is at its lowest ebb, will they dare to undertake any gold-washing, and then only after one of their most solemn ceremonials.

Before deciding on a day to commence the gold-washing, some of the children—in order, as I imagine, that no suspicion may be awakened among the river spirits that the search is intended—are sent to report whether the river is sufficiently low, and in a favourable condition. On their return the people are assembled, and public proclamation made—"Oh! ho! ho! four days hence we go to gather gold." On that day the *Dato-luli*, dressed in all the vestments of his office, proceeds (in the district of Saluki) to the top of the curious Peak of Fatumaruk, where a flat stone exists which is supposed to be the most sacred altar in the kingdom. Behind him follow all the people—men, women and children. The older men seat themselves on the ground nearer to the Dato, the women, children, and younger men keeping at a respectful distance. The *Dato-luli*, then in front of the great stone, invokes the Spirits of their dead, Maromak of the heavens, and Him of the earth. All then return to their homes, where each acting as his own "house-priest," kills a fowl or a small pig,

and offers on the *Luli* stone in his own house, which he then carries to the river to wash the auriferous sand over. It is affirmed that every one finds gold on that day—more or less, all some. The ritual to be followed by one who is to search for the first time differs somewhat from that observed by those who have searched before. On his return from the mountain the celebrant must enter the *Uma-luli*, taking with him a fowl or a young pig, which, after he has made what appears to be a sort of confession to the Dato, is killed and a piece of flesh from its heart and from its jaws is offered to the Luli, the rest being partaken of by both of them. The novitiate gold-washer, after receiving some sacred siri and pinang, accompanies the Dato to the river, where, after another fowl or pig has been killed he may collect sand anywhere at random, and "of a surety he will find gold in it, for Maromak who alone gives the gold will give him fortune."

After ascending the river bed for three hours, we turned to the left up the Fatumaruk Peak, 3400 feet, to the chief of Saluki's, where I spent several busy and successful days among the vegetation of the deeper ravines. This was the first metalliferous district I had visited, and for the first time the proportion of the people suffering from goitre was so large as to attract notice from the most casual observer.

CHAPTER IV.

SOJOURN IN KAILAKUK AND SAMORO.

I proceed to Fatuboi—River Motaai—Crystalline rocks—A weird village—Rare additions to my herbarium—Butterflies—Move on to the Rajah of Samoro's—Vegetation by the way—Geological notes—Penalties of theft—Samoro—Visit Sobale Peak—Botanising under difficulties—Large herbarium—Return to Samoro and leave for Manuleo.

From Saluki I proceeded with a fresh cavalcade towards Fatuboi, a conspicuous quadruple-crested mountain of remarkable configuration, in the Suku of Kailakuk. We had to commence with an inevitable descent of more than 1000 feet, to the bed of the Motaai, which, like all the Timor rivers I had made the acquaintance of, ran in a deep bed within precipitous walls, which in some places rose nearly 300 feet in height, clothed with unfortunately for me inaccessible vegetation. After following its course for four or five hours, we turned off to the right, up the bed of a small tributary, in which I found blocks of pure white crystalline limestone, a kind of rock I had not encountered before. Hence ascending a long steep ascent of 1500 feet strewed with disrupted blocks of limestone, we reached the top of the mountain, and by a narrow rocky stairway winding through a belt of impenetrable jungle of thorny shrubs, were guided into the most weird spot conceivable for human habitation, into a small plateau on the summit of one of the rugged eminences of the mountain. Guarded on all sides but one, by vertical walls of limestone, the plateau was dotted about with gigantic blocks of rugged and warted coral-like limestone, against and between which dwellings standing on piles on the bare rock, were scattered about. To right and left rose immense rough, almost inaccessible pinnacles of the same black withered calcareous crags, riven in all directions with cracks, cavernd into dark

forbidding caves, and traversed by chasms many feet in width and to the sight reaching down to unfathomable depths. In front of one of these caves an aged fig-tree, adding its awesome effect, had dropped its tendrils and wound its roots into every crevice in weird and gruesome shapes. The place was just such as would overawe the timid and superstitious native mind, and I was not surprised to see that there were nearly as many *Luli* houses as dwellings, and that before the door of the caves stood a *Luli* stone on which to propitiate the spirits that haunted their gloomy recesses. The whole summit of the mountain looked as if it had been shattered to its very foundation by some gigantic convulsion of nature. The natives told me that earthquakes, which were the result of Maromak nodding and letting the world slide off the straight for a moment, were frequent and severe.

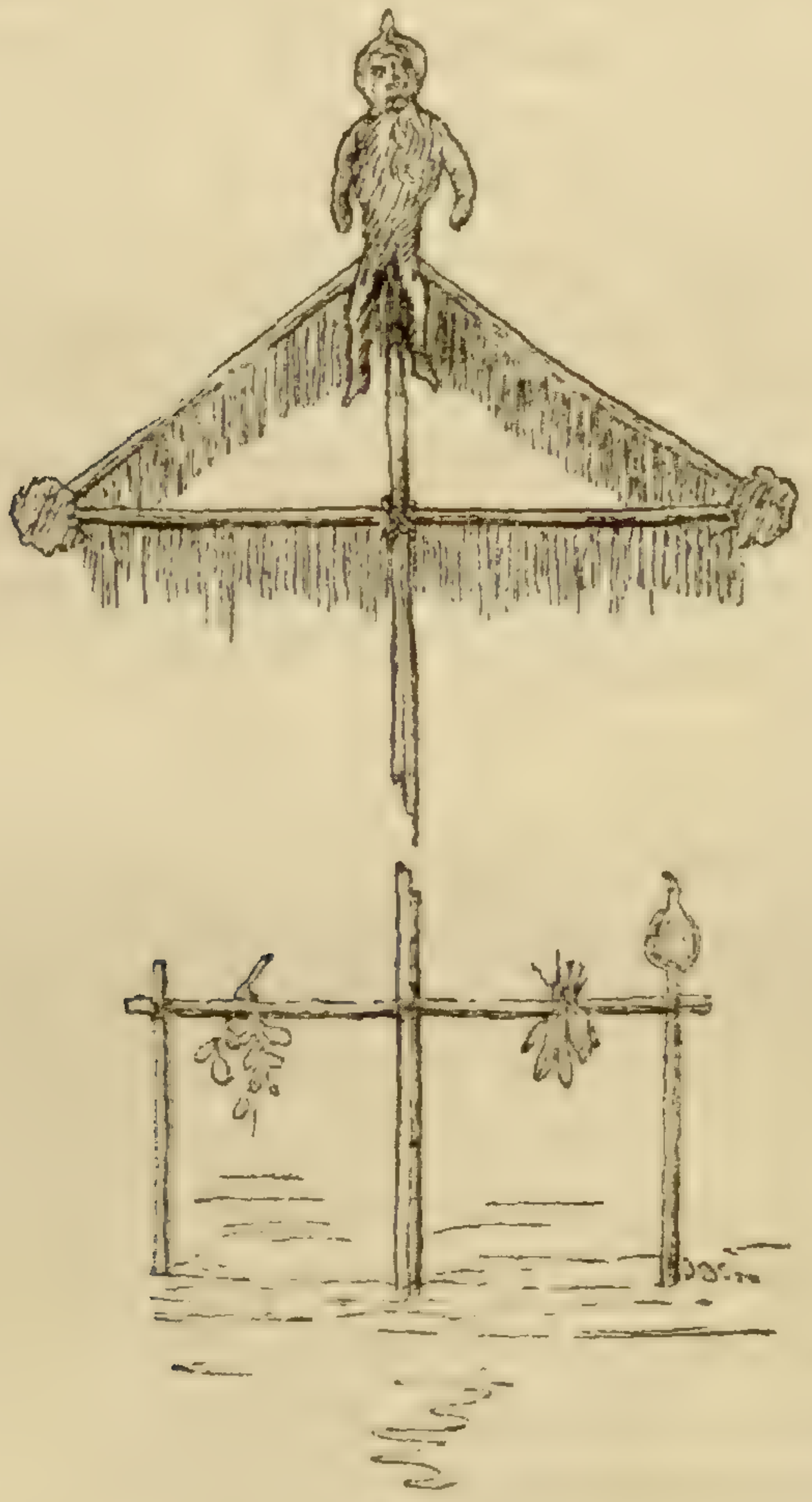
Here I made some most curious, interesting, and very rare additions to my herbarium; the most attractive an epidendric orchid, and a beautiful species of passion-flower which overran with its bright star-like blossoms the spiny vegetation I have mentioned; while the rarest was a curious aroid, *Remusatia vivipara* growing in soilless cracks in the calcareous rocks, whose seeds, as its name implies, germinate in their capsules before dropping; and the most annoying a shrub with intensely prickly foliage, called by the people there *Silatik*—a plant much dreaded by them; for when my face was stung badly, by having come in contact with its leaves, they exhibited great concern especially for my eyes, and conducted me away from it. I tried by rubbing several succulent leaves on the affected part to allay the severe smarting, till a little urchin who was following me, after shaking his head in the most significant way to say that they were no good, proceeded to pound down some of the calcareous rock into a fine powder, which he brought to me to rub into the wounds. The application was, if not curative, very cooling, but the pain did not subside for a long time. After I had left the place I learned that it is the juice from this tree that is applied to the tips of their arrows as a poison. Among the few butterflies I obtained I netted, with a heart palpitating with pleasure, the lovely *Cethosia lamarkii*, whose azure wings had tantalised me by flying along the front of the inaccessible cliffs of the river bed below.

The trees on the perpendicular faces of the rocks were crowded with the only mammalian animal I had yet seen, a lively grey monkey (*Macacus cynomologus*), which chattered and squeaked most lustily at my intrusion.

With a few extra porters, necessitated by the considerable additions made to my herbarium here, we started north-east for the Rajah of Samoro's, in whose territory stood the Peak of Sobale, whose summit I wished to visit. The road thither, which like all others in this grooved and excavated island never betook itself along a plain, was a hot and weary up-and-down trudge through fields thousands of acres in extent, of tall grass and canes, sparsely dotted with bamboo clumps, with Casuarinas, Acacias, and Euphorbiaceous trees, which simply cumbered a vast extent of what seemed very fertile black land. Starting at 2500 feet above the sea, we meandered through a shallow hollow up to 2700 feet, thence we followed a long winding descent—which, though interspersed with humps and hollows, might in Timor be called level—to 1400 feet where we struck the highway of the Fahiletan river-bed which brought us 400 feet lower to the residence of his Majesty of Samoro, whose son received us. The river banks were wooded with Casuarinas, Myrtles, and Gum-trees (which had again become abundant), interspersed with dense and impenetrable thickets of Bamboo-durie (*Schizostachium durio*), which offered a splendid hold for the beautiful feathery *Asparagus racemosus* and the tendrils of that grand Timor lily, the *Gloriosa superba*, whose curiously coloured corolla, half scarlet half orange (entirely changing after fecundation to scarlet), overspread its great clumps with a fiery blaze of flowers, while that once so rare and highly prized of orchids, the *Vanda insignis*, rejoiced our way with its fragrance.

The strata cropping out in the river-bed were quite different from any I had noticed elsewhere on my journey. They were pale-gray rough crystalline sandstones in beds half a foot thick, alternating with black bands of about the same thickness of what had been once fine mud, whose lower surfaces exhibited radiating annelid-like fossil impressions. These stratified rocks, which dipped into the river at a high angle, were in many places clearly seen to be entirely embedded after they had begun to be attacked by some eroding

er denuding agency, in the horizontally laid-down black shingly detritus which I have already so often referred to, plainly indicating that at some epoch not geologically very remote, they had been long submerged, as the whole of Eastern Timor seems to have been, below an arm of the sea, or possibly beneath an inland lake; and after some hundreds of feet had accumulated on them they were again subjected to



KERO

elevation—which has gone on so long, and may still be progressing—that the rivers have cut their way down through hundreds of feet in height, and cleared out ravines a thousand or two of feet in width. Such is the story of the strange vicissitudes of Eastern Timor revealed by the buried rocks in the valley of the Fahiletan.

At the entrance to the Rajah's compound I was startled by suddenly coming on a tall pole with a fringed triangle near

its summit, the pole, as I thought at first sight, impaling a human body, and the outer corners of the triangle transfixing each a human head. These were happily only made-up representations of what at no far-back date would have been realities. This ghastly sign-post, called a *kero*, had been erected as a warning to all thieves and offenders of the dire punishment that would be mercilessly meted out to them, just as it had been (or would have been but for the intervention of European law over-riding their own) to the three whose cranial effigies were exposed on the kero, who had been convicted of stealing fruit, as the bunch of cocoa- and pinang-nuts hung on a railing below them indicated.

The law of the different kingdoms is a *lex non scripta*, and has been handed down from generation to generation. The *Leorei* is judge as well as king, but acts only, however, on the rare occasions when a case is brought before him on complaint, his judgment being for the litigants always a costly boon. Every man or his family exacts justice by his own individual arm on the person or his family by whom he has been wronged. If the wrong-doer has goods or chattels on which a fine may be levied, the wronged as a rule exacts a fine in expiation. Homicide is revenged by death, but this penalty can be averted by the payment of the equivalent in money or goods demanded by the relatives, and the substitution of some one of the offender's family to take the place of the slain. A robber taken in the act used to be executed on the spot—and is even now when the avenger is likely to escape punishment by the European authorities, who have rightly interfered with the old savage administration of justice in the rajahships—and if the theft consisted of a living animal the head of the animal was struck off and affixed near that of the robber on a stake.

Every crime, however small, could be avenged by death, but if the offender were sufficiently rich, they could all be expiated by a fine except two: adultery with any of the rajah's family, and the being a *Swangi* or sorcerer, for which the punishment—or perhaps it ought to be called *cure*—was impalement with all his family, and confiscation of their goods for the benefit of the accuser and of the lord of the soil.

Law and justice are to be seen in Timor, at the present day, emerging from the rudimentary stage. Hitherto each native

has exercised "the right which formed the main check upon lawless outrage, the right of private war. Justice had to spring from each man's personal action, and every freeman was his own avenger. The bloodwite, or compensation in money for personal wrong, was the first effort of the tribe as a whole to regulate private revenge." *

As the taking of life is strictly forbidden by the Portuguese, and punished with the utmost severity when proof can be obtained, causes before the Rajah are becoming more frequent in order to obtain the fines which the wronged claims from the wrong-doer for his offence, which in former times, if not paid, would have been atoned for by his head.

After a day or two's botanising at Samoro, accompanied by the king's son, I started on the 30th of April on a sure-footed little pony I had purchased from the Rajah of Bibiçuçu, for the top of Mount Sobale, travelling in a direction N. 21° W., up a more gradual slope than usual to 2600 feet, whence we looked down into the valley of the Buarahu. Here some of the wildest and grandest scenery of our whole journey met my view. It is impossible to describe the castellated crags and lines of perpendicular and inaccessible cliffs that reared their giant masses sheer above the landscape, or the irregular blocks that thrust themselves through the grassy slopes, as if they had been dropped about without any relation to the geology of the region. Meantime they remain in undisturbed keeping for the tourist of the future in quest of striking and impressive scenery.

Turning to the left, we followed a path on another of these inevitable razor-edge ridges, only the width of the path broad, up which our ponies carried us with scarcely a rest to an elevation of 4000 feet above the sea—a brave feat of climbing which well earned for them the hour's relaxation at Manulu, where we rested before setting our faces towards the steeper shoulder of Sobale. This farther ride took us round the head of the valley of the Buarahu by an eerie and dangerous path, dilapidated and often landslipped, in which at many points a single stumble of our ponies would have left nothing between us and a fall of 2000 feet into the river bed. At 5000 feet, where we reached a safe road on the mass of the mountain

* Green's 'History of the English People.'

itself, I could freely turn my attention to the thousands of violets, geraniums and labiates that decked the ground, and the profusion of ferns that loaded the banks and the trees, among which I observed, in the forest that covered the upper 2000 feet of the peak, abundance of Pandans, Casuarinas, and other Pines. To my infinite disgust and disappointment, I overheard the Rajah's son tell my interpreter to warn me that all the forest was rigidly *Luli*, boding ill for my next day's prospects. By dropping behind, however, out of sight, I that night made sure of all that I could possibly carry, and followed quietly through little belts of vegetation of the greatest interest to Fumuruan, the little house-cluster on a lower spur of the mountain where we had arranged to camp.

I retired to rest with a well-laid plan of rising early and slipping off to the mountain without being seen or followed. There was little inducement to lie late, for my couch was uncomfortable and the night-wind cold; I was therefore easily ready for the field before daylight. After a hasty breakfast I stepped quietly away for Sobale attended by my Hindoo corporal, and thought I had succeeded in escaping unperceived, especially as a dense mist enshrouded the mountain. Alas! we had not gone far when I discovered that quite a little crowd, following the Dato of the place, was on our trail. There was no time to be lost, so I hewed away right and left on the slopes below the summit, building up a high pile on the ground of the most delightful specimens.

The unwonted operations of a white man, the first who had probably ever ascended their mountain, kept them for a while at a little distance watching my operations in silence. My hopes began to rise that perhaps I was mistaken in what I had overheard the day before. It was a vain delusion; for their low murmured reproaches at last found distinct utterance in complaint and remonstrance. The corporal was besought to restrain me, and save myself as well as them from the retribution of sickness and death that certainly would follow on the violation of the sacred precincts. I told my Dilly interpreter to express my deep regret, and that I would at once desist; but I gave him to understand that he was not to bring me any more of their messages nor heed me in whatever I did. Moving off to some distance higher up, I recommenced on a new

clump, which perhaps *might* not be *Luli*, and, like a drowning man catching at his last opportunity, I gathered with a will, unhindered for a long time; and it was not till I had another great pile heaped up on the ground that their excitement and superstitious fears became too marked to be longer disregarded. Luckily, the thick mist which had been resting on the mountain-tops all the morning came down in a heavy shower of rain, and gave me a good excuse to return to quarters, with my trophies a five-men's load, without appearing to have recognised that I had been offending. It was useless to attempt to force an ascent to the top; there would have been an outbreak, for the crest of the mountain was evidently one of their most sacred spots. What I had already done excited them greatly.

The rain that fell cleared off with it the mist, and revealed from our high vantage-ground a magnificent view of the country, both to the south and to the north—especially to the north, as far as the islands of Kambing, Wetter and Allor,—which was of itself worth the long climb from Samoro's guarda.

The careful arranging and packing of each species in separate bundles of cool banana-leaves, convenient for the seven or eight porters to transport, took a long time, so that it was late in the afternoon when we mounted for our return journey. If our ascent in broad daylight round the face of the Buarahu valley was eerie, it was foolhardy when, by the time we retraced our steps, it was so dark that we could not see a single foot of the way. I threw my horse's reins on its neck and trusted to my general good-fortune; and it was really with no affected thankfulness that I embraced the neck of my sure-footed black steed, when I leaped down safely on the little flat plateau of Manulu homestead. Here after a deal of boisterous shouting to the inhabitants to awake—they seemed to sleep with the soundness of the dead—on the part of the Rajah's son, in whose harangue the most intelligible word to me was the vigorous use of *Diabo*, an old man the only male in the place, made his appearance. Finding the quality of his guests, he was at once all alacrity as far as it was possible for a Timorese to be, and proceeded to rouse the womankind to prepare for us something to eat, and a place to pass the night in. A kid and some Indian corn supplied the first, and for sleeping-quarters we were actually installed in a *Luli* hut,

from which, however, the sacred weapons were most carefully removed and at the owner's earnest request all our tobacco was excluded. Notwithstanding my sore disappointment that I had not set foot on the highest peak of Sobale, I slept with my head on my saddle the sleep of the contented, for I had gathered rare plants enough to delight any botanist's heart.

At five o'clock in the evening of the next day I reached our old quarters, but it was the early morning hours before all the plants were, under torch- and lamp-light, safely put away in botanical paper and placed over the fire of the drying-house, in attending to which and turning the bundles several men were employed all through the night. Before eleven o'clock in the forenoon they were dry enough to carry safely to Manuleo, my next station, where they would be again placed over the camp fire.

Retracing our steps, as if to Sobale, we descended to the right into and across the Buarahu river, ascending to Manuleo —4000 feet above the sea—through a rich grassy landscape in which thousands of sheep ought to have been pasturing, were a shepherd's not too peaceful a calling to be attracted to a region where keros might be a possible feature of their fields. Such a warning pole raised its ghastly arms against the sky before us. It was surmounted this time with the veritable head of a thief caught in the act of abducting a horse, whose skull seemed to mock with its grinning line of teeth, its abductor's, to which it was joined by the halter which in former time encircled its neck. It does seem a singular custom for the owner to sacrifice his stolen horse the moment it is recovered, to add to his retribution of the thief. A horse once stolen is gone for good, it would seem.

CHAPTER V.

RETURN TO EUROPE.

Bad news from Dilly—Start thither—Camp in the open—Bees—Laclo river—Rajah's of Laicor—The Queen of Laclo—A hot ride—Geological note—Matu—Metinaru—Salt marshes—A long night-ride—Return to Dilly Palace—Extract from A.'s journal—Return to Fatunaba—Fevers—Decide to return to Europe—Surprised by the arrival of steamer—Regretful departure from Fatunaba—Revisit Banda and Amboina—Menado—A lucky accident—Batavia—Krakatoa—Home.

NEXT morning, just as we had set out, we were hailed from a neighbouring height by a man whom I made out to be in military uniform. On coming up, he informed me that he had been trying to overtake us for many days, and delivered to me letters from the Government Secretary (Senhor Bento da França) to say that Mrs. Forbes was very ill, and urging my immediate return to the Palace whither she had been conveyed from Fatunaba. As the route I was following was the nearest, I could gain time only by making forced marches. Descending by an undulating route to the Vebirah river, we reached the first level ground traversed in our journey—a plateau clothed with gum-trees parallel to and sloping gently with the course of the river, and about one hundred feet above its channel. In being entirely composed of a perfectly horizontal mass of sand and small pebbles, embedding strata of crystalline sandstone which protruded through it at a high angle, its geological features were identical with what I have described as seen in the Samoro and other rivers I had crossed.

A little before sunset, after a march of ten hours broken by a halt of only thirty minutes, we camped on a grassy spot on the bank, in little extemporised grass huts. During the brief twilight after the sun had disappeared, the air for some twenty minutes was suddenly filled with the hum of bees (*Apis dorsata*), as if a swarm had alighted among the flowers of the Gum-

trees. Just before daybreak while it is still dusk, the morning air is in a similar manner inundated with their noisy hum. This singular habit of these bees, in feeding in the sunless hours of the morning and evening, I was totally unaware of till I came to live at Fatunaba, where close to our door a grove of these trees grew. In the evenings the *Melaleuca* certainly becomes more fragrant than it is at midday; but I could not ascertain, what would be very interesting to know, if its flowers exude their nectar, or shed their pollen more freely late in the evening and early in the morning,

After a comfortable enough night, which favoured us by not raining, we resumed our march before dawn. I was anxious to start sooner, but my carriers refused to travel in the night till "the three rajahs in pursuit of the seven maidens" had set, and Rai-naromak (Venus) had risen some twenty degrees above the horizon. Following the Vebirak we reached the bed of the Sumasse, a river many hundred yards broad, running between vertical walls of shingly detritus some two hundred feet high. Its channel gradually widened out into a broad shingly expanse full of Tamarind trees, Acacias, Palms, and Cactus, till it finally merged in that of the river Laclo (which I had crossed far up at Sauo on the outward journey), over whose broad tree-dotted estuarine plain, their united streams having outrun their high shingly barriers, distributed their water in rivulets, which near the headland of Illimanu debouched into the sea at no great distance below where we turned our faces back westward to ascend again the valley of the Laclo.

A little distance up the river's left bank we came to the Rajah of Laicor's, whose people were housed in the most miserable dwellings we had seen—in low huts on the ground of a mere thatched stockade of palm-leaf stems, with a platform or two against the walls within to sleep on. The Rajah, an opium-besotted individual, refused to help me with a change of horses and men, but I compelled him much against his will, to supply our whole company with the breakfast—of pig-flesh, rice, Indian corn, and fresh-drawn palm-wine—which we were so much in need of, it being then nearly ten o'clock, and none of us had eaten since the previous evening. The headquarters of the Rajah of Laclo were fortunately quite near on the other side of the river, and thither we proceeded, and for the first

time found some signs of state and of a more advanced civilisation. I found here a large Catholic church, which on all religious days, I was told, was very well attended. The entire population of the kingdom professed Christianity; and the outward indications of general advancement over their neighbours was apparent; but I cannot say that in individual characteristics I observed much improvement. The missionaries of the Roman Catholic, perhaps more than those of any other, Church deserve the highest praise for their great self-abnegation and for their persistence in seeking out the most discouraging spots of the globe, where their simple life and fraternal interest in the concerns of the native, have exercised a powerful civilising effect.

The present ruler being a female, all business was transacted on her behalf at the palace-guarda, a strong, neat, wooden building near the royal enclosure, in which a high official was always in attendance in command of an armed guard to keep watch over the regalia and treasure stored there, as well as over the prisoners confined in an adjoining building. These miserable creatures, however, had little chance of escaping from the rough hurdles on which they were condemned to lie, with their feet fast in the stocks, and their necks through a hole in a great log of wood too heavy to be easily moved. Many of them had several months of their punishment still to work off, but for what crimes they were suffering I could not discover.

On my arrival, I immediately sent my letters to "Her Majesty," requesting to be furnished at once with fresh horses and a guide, to continue my journey to Dilly, which she courteously promised should be ready for me at daybreak. It would have been too literal an interpretation of her promise to have expected to get away at that hour. At ten o'clock, however, the horse and guide arrived, and I started at once, leaving my impedimenta to follow behind, in charge as usual of an official of her kingdom and of my faithful and intelligent companions, the Hindu officer and corporal, without whom as representing the Government, my journey into the interior would have been an absolute impossibility.

The broad channel, first of the Laclo river and then of its tributary the Liguani, formed a magnificent highway, along

which I passed westward at a steady pace, under a thermometer marking 110° in the sun and 92° in the shade, between low undulating hills clothed with a shrubbery of *Zizyphus Jujuba*, and entirely composed of horizontal beds of shingly detritus, till at four o'clock I struck off to the right up an abrupt rise of 1500 feet by a path studded with crystalline calcareous rocks and boulders with a flinty clink, rounded by attrition and perforated with holes and crevices like coral blocks, bored by mollusca and sponges, which had been raised up out of the sea. Strange to say, on the descent of the northern slope, not a single calcareous block or stone was to be seen anywhere.

As we commenced this descent, which was quite steep and precipitous, in the fair way of the path we came on a little mound which they called *Matu*, round both sides of which the road diverged. Each native with me gathered some leaves or a twig from a tree and laid it on the mound, "to ensure a safe descent." On the trees near by were hung up various articles—cigarettes, coïs, little cigarette cases, and leaves in which rice had been carried, and stumps of Indian corn heads. I have recorded above almost the same custom in Sumatra, where, on a large block of stone by the side of a forest path something was offered by every passer-by for "luck." A parallel * exists at this day in Dauphine, where every passer-by throws into a certain chasm a little stone as an offering to the mountain spirit; and I believe the custom is not unknown in our own country.

Reaching Metinaru long after sunset I halted to rest my horse, for the first time since starting. Resuming the march after two hours, I pushed on westward along the sea-shore, through a long stretch of salt-marshes, which in the starlight looked like snow-fields. Near Hera the flat shore-lands are barred by the spurs of the hills which run out into the sea there to form that high headland; and, looking back on that dark night's ride, it seems marvellous how we surmounted without accident their rocky spurs, where the path was often interrupted by perpendicular steps many feet in height, down which, followed by my horse, I scrambled, more by the sense of touch than by that of sight. At daybreak I

* Waitz, 'Anthropology,' p. 321.

gained the last height, looking down on Dilly and the familiar island-dotted scene, and reached the Palace at eight o'clock, where I was thankful to find A. amid our kind friends much recovered, but showing in her emaciated figure how severe her sufferings had been. When the trying strain she was exposed to and her terrible position and privations are realised, it is surprising not that she at last broke down, but that she bore up so long and so bravely. From her journal, which she had struggled to keep, I have extracted a few entries, commencing some days after my departure.

"How exceedingly still it is! Birds now come and perch on the very rail of the verandah—lovely little things which we could get only a glimpse of before; and in the near vicinity the Gamut-bird practises its notes, to whose clear *crescendo* I listen with rapt attention. Towards evening I look, eagerly even, for my little woman. The first time I saw her she was sitting under the sloping roof of her hut, devouring an unripe mango, and I stayed to look twice to be sure that she was really human. And this is my sole companion, for whose return I long! I am trying to pick up from her some words of her language; in exchange I was going to teach her civilised ways. Feeling too weak to brush my hair, and thinking it would be delightful to have again that little attention, I showed her how I wished it done—by quick, firm strokes. She nodded assent, and took the brush; but, alas for my hopes—she vigorously imitated my action—with the back of the brush!"

[Other visitors than birds came about her dwelling for] "A wild-looking man from the mountains came past, and, evidently struck by the novel-looking hut, with its appurtenances of civilisation and its white inhabitant, he stayed to satisfy his curiosity, and, after going round to look at everything, he lay down on the verandah to stare at me"; [and] "last evening at sundown my quiet was disturbed by the advent of a number of mountain men, who, after coolly monopolising my fireplace to roast their supper of maize at, spread themselves to sleep on my verandah. It was gorgeous moonlight; and, as I was very wakeful and restless, I rose to look at the group in deep sleep around me. What a very strange experience for an unprotected woman, in a doorless hut, on a lonely hillside, thus

surrounded by a number of semi-savages! I have been trying to occupy myself constantly to divert me from the loneliness of my situation, but I am often helpless from fever."

"My nights quite sleepless, I lie and listen for the return of the thieves" [who had entered and robbed the house, and had a second time in the middle of the night returned, decamping, however, on A.'s calling out, and who, had she dared to oppose them, would not have scrupled to put it beyond her power to turn informant. When writing to me in the interior, with rare self-denial she restrained from telling me the state of affairs at Fatunaba], "and am consequently daily more and more attacked with fever; but I must make an effort to see to the fire in the drying-house, where the herbarium arriving from the interior is deposited." [After a considerable break:] "Long bout of fever: unable to do more than sit on the verandah; the silence is most oppressive; my old woman is getting tired of her duty, and forgets to come to me. I dare not express displeasure when she does come, lest she desert me utterly. I carefully concealed from H. all mention of my loneliness and of the old woman's defalcations, as it is of the greatest importance that his mind should be free from anxiety on my account; but perhaps it had been wiser to tell him; for I feel very ill, and it is only the thought that these rare plants must be tended that keeps me on foot."

[After another long break:] "At the point where my journal is discontinued I quite succumbed to what was as much nervous as malarial fever; day after day attacks came on with increasing force, while my powers to help myself became decreased. The old woman at last would not come near me; by signs and much talking she indicated that she would be tabooed by her own people if she stayed by a sick person." [She doubtless feared that she might be thought a Swangi or Disease-producer.] "I had then to fall back entirely on myself, as she would not carry any message for me to Dilly. Fortunately there was a store of water in our large stone tank, and my small paraffin-stove was full of oil. In a stronger hour I dragged some boxes in front of my bed, and placed within reach rice, salt and some vessels. Eggs in abundance must have been within a few hundred yards of me in nests among the grass, to which I had traced our few fowls, but I dared not ven-

ture so far in the morning—the only time I had a little strength —in the very high winds that prevailed. It is one phase of these fevers that when an attack has passed a great faintness comes on, which even a mouthful of food or drink will relieve. I never fully realised the boon of sick-room attentions till I had to rouse myself at these faint moments to cook the only available food I could take—rice-water. But the oil in my small lamp at last was done, and I was unable to go to the store to refill it. For some days I must have been delirious; during the nights I tossed in my sweat-soaked garments, sometimes able to reach out for dry ones, sometimes not; but, more than from all the discomfort and weakness, I suffered from the terrible stillness. Undisturbed, the rats played in wild riot through my hut during the day, and in the night gnawed everything gnawable—sometimes they even attempted to penetrate inside my mosquito curtains, within which I had dragged my store of rice. So ferocious were they that I saw them seize a parrot on a tree which overshadowed the hut, which they brought to the verandah and devoured there, while the feathers scattered in the wind. I shuddered to think how H. would find me if I should die before he returned or help should come. A passing lad—whom I sighted through the bamboo slits of the hut—I called to me, bribing him by coin after coin to carry a note to the Palace begging for medicine and aid. Just as he at last consented, after much dubitation, and the most urgent entreaty on my part, it began to rain [rain is always abhorred by the natives], which made him hesitate in his purpose—a terrible moment for me; but, espying my open parasol in a corner, he seized it and marched off. I don't know whether my hilarity in my utter prostration was more at the ludicrous figure he cut, his only wettable garment being his loin-cloth, or in hysterical and delighted anticipation of obtaining help at last."

As good fortune would have it, this lad met a messenger from Madame da França, who had become anxious at A.'s long silence, on his way to inquire for her. The news of her state brought at once the doctor and a friend who instantly returned for an ambulance. Though the afternoon was far gone before it arrived the descent was at once begun. The carriers struggled on while daylight lasted—one short hour; then, owing to the steepness of the road and the darkness of the

night, they refused to carry longer, when she had to walk. After a terrible journey of five hours duration she reached the sympathy and comforts of the Palace—kindnesses which will be treasured by us both as long as we live.

We returned at once to our home at Fatunaba, whose beauty was as fresh to us as ever, and it was impossible not to feel that there could be no fairer spot for a dwelling. I had sufficient to occupy me for several days in arranging the herbarium already in the drying-house, and when three days later, the giant packages collected between Saluki and Laclo arrived I had work for several weeks. We had not long settled when A—— was again laid down with a most violent type of fever which then seemed to be specially epidemic in Dilly, and to which one of the Governor's sons succumbed in a sudden paroxysm. As these attacks, notwithstanding all the remedies tried, daily became more severe, we decided that as I had accomplished all that was possible in Timor, and as nothing in the way of fitting out for my next journey to the high mountains of South-Eastern New Guinea could be done in Dilly, our wisest course was to return to Europe by the mail due about the 3rd of June.

On the 30th of May, on coming out at daylight into the verandah, I was thunderstruck to see the mail steaming into the harbour—when there was not half of our baggage packed, and all the porters to find. Hurrying down to Dilly, I learned that there would be no other steamer for five weeks, but that *The Lansberge* would remain till next evening. Through Senhor Albino's kind aid I obtained a company of men in charge of a sergeant, and, hastening back to Fatunaba, packed up my collections and such articles as we most valued, as it was evident that all our belongings could not possibly be transported in the short time at our disposal. The Timorese carriers and A.'s old ape-like woman—though she did not deserve it—were made frantically happy by rewards of household gear and paraphernalia, plates, spoons, knives, cooking utensils, old meat-tins, and gifts of such trade articles as mirrors, beads, and kerchiefs, as had escaped the notice of the thieves.

We were forced to leave behind us the whole rude furnishings of the house—stoves, lamps, water-tanks, cans of petroleum, stools, gunpowder and shot, and a considerable store

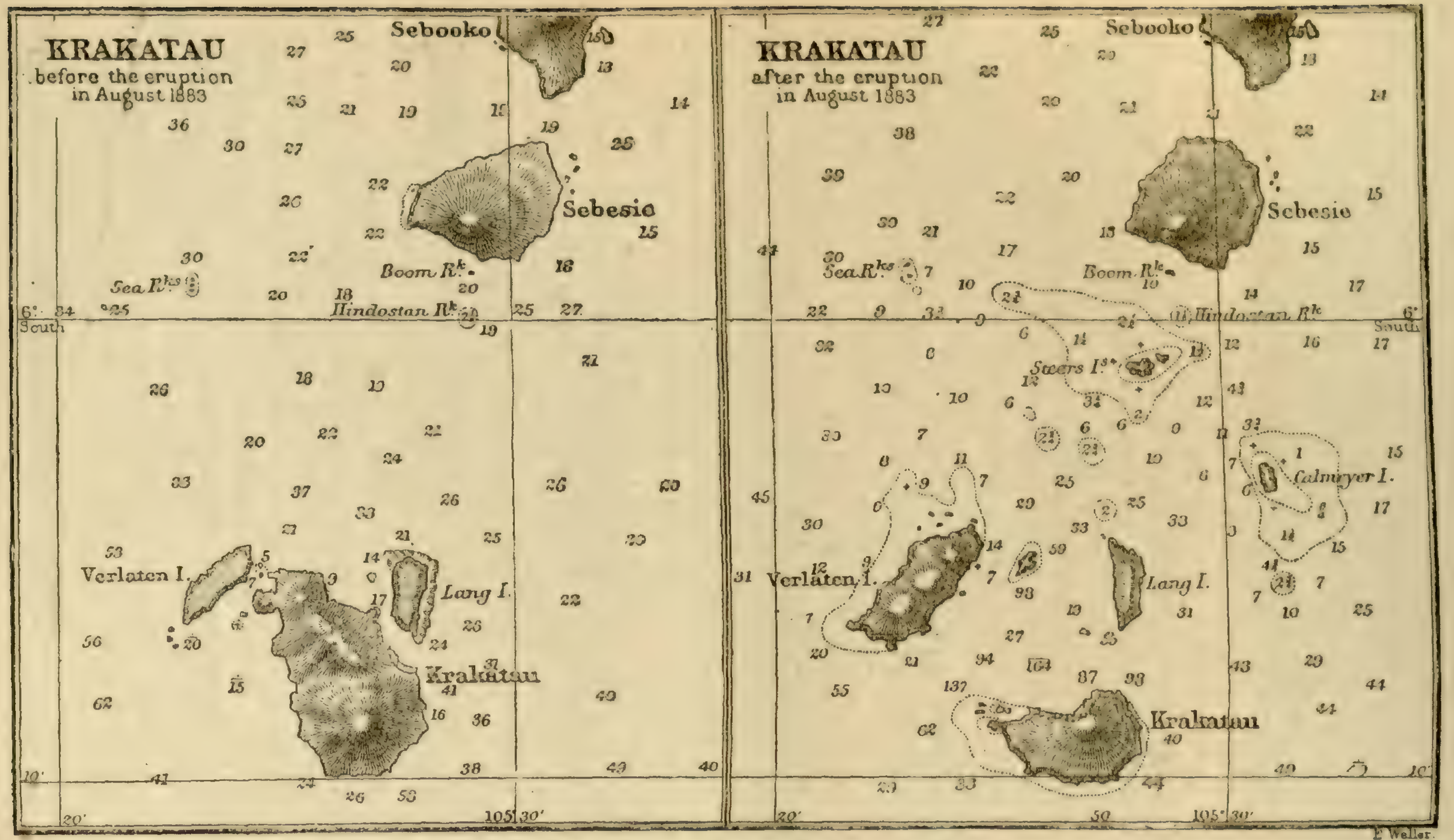
of kanipa, or gin, with filthy spirits of wine in bottles of the same shape. We have often pictured to ourselves the astonished eyes and the jubilant dance of the first Timorese who, passing by, should find the deserted hut, and its Eldorado of kanipa and the rest, especially if he commenced with the snake-tinctured spirits of wine—all his for the appropriating!

By five o'clock in the evening the last porter's load disappeared round the elbow of the hill; but we remained behind for a little to take a last sorrowful farewell of the sweet spot in which we had spent so many days of privation and sickness hard enough to bear while they lasted, but which have long been quite forgotten, while the supreme happiness we experienced in our work together and the surpassing beauty of the scene on which we daily looked, will remain among our most treasured reminiscences as long as memory lasts. As it was impossible to obtain sufficient porters to carry A. the long irksome descent had to be accomplished on foot, painfully, but with uncomplaining and resigned cheerfulness, for was it not for the last time? By nine o'clock we stepped on board. Owing to the fall of a horse baggage and all, down a steep slope, and the breakdown and running away of some of the porters, it was only at sundown of next day that the last of our baggage was safely shipped. By a happy coincidence the Governor and his family—fewer by two, and wofully altered by sickness—were again our fellow-passengers on their way back to Europe.

In the early morning of the 1st of June we steamed away for Batavia *viâ* Amboina, and a few hours later our hut on the Fatunaba rocks, glinting in the morning sun, disappeared below the horizon. After one more day under the nutmeg arbours of Banda, and a farewell visit to our friend's Machik in Amboina, we reached Menado on the 10th, where we were delayed by rough weather. "It's an ill wind that blows nobody good." In the gale our steamer dragged her anchor, which had to be hauled in, and when it appeared it brought with it three other anchors, where,

> "On an island's winding shore,
> There for ages long they lay,
> At the bottom of a bay,"

each more foul than the other, with hydroid Zoophytes, Sponges



(From the 'Proceedings of the Royal Geographical Society,' with kind permission.)

and Crustacea, which were specially handed over to me and carefully bottled. A list of them is given in the Appendix.

Off the north-west cape of Celebes, we passed between the mainland and a broad slice of land, with small trees and stumps erect on it, drifting in a north-easterly direction. After short calls at Macassar, at Ampanam in Lombock, and at Baleling in Bali, we reached Surabaya on the 23rd of the month. Here we had with deep regret at last to say good-bye to the Da França family, to whom we had been indebted for the greatest possible official and private kindnesses, as it was necessary for us to trans-ship for Batavia, where we arrived five days later.

We had nine days to spare before the arrival from Brisbane of the mail for Europe. These were spent in the delicious and salubrious air of Buitenzorg, in packing up my bulky herbarium, and in the renewing of many old friendships.

On July 9th we sailed in the British India Company's mail steamer *Quetta*—at last homeward bound. At sundown we dropped our pilot at Anjer sleeping peacefully among its cocoa-nut palms, and a few hours later passed the blazing crater of Krakatoa—scenes well known and familiar to me, of which I retain many most pleasing memories; but it was the last look that was ever to be possible to me; for, ere little more than a month had passed, both were doomed to destruction.

A study of the small maps on the preceding page will convey some idea of the violence of the eruption, from the changes that have resulted in the geography of the spot.

On the 13th of August the *Quetta* reached Plymouth, and on the 14th we arrived in London, transported in 75 days from the make-shifts, discomforts, and rough contrivances of a rude hut among half-naked savages, to all the elegances of a great London hotel, with its fashionable crowd, a contrast—to me certainly—too great to be comfortable or pleasant for some time at least. I realised that I was more than half a barbarian, to whom the restraints of civilisation had become irksome, and who would have rejoiced to have been at once spirited back again to his swarthy friends in the Eastern Archipelago.

APPENDIX TO PART VI.

I.—*Names of the* MONTHS *in Timor.*

(Saluki) Bibiçuçu.		Samoro.	
Funu ..	In this month (corresponding to about our December) they plant the *vater*, or Indian corn, and sow the dry ground rice.	*Leët ali* ..	Same operations.
Fahi ..	Clear grass out from among the *vater* and rice.	*Fahi* ..	Same operations.
Naru ..	"Great month." Indian corn is in flower. Heavy rains and all rivers flooded.	*Naru* ..	Same operations.
Fotan ..	The name of the month probably a corruption of the Malay *Potong*, the cutting or harvest month. In it they gather in the ripe Indian corn, and give a great offering to the *Luli*, a sort of Harvest Thanksgiving, the Indian corn being their staple food.	*Tora* ..	Same operations.
Madauk ..	Harvest dry rice fields. ..	*Madauk* ..	Same operations.
Wani ..	Honey and wax Larvest. ..	*Wani* ..	Same operations.
Uhi	Possibly a corruption of *Ubi* or sweet potato, which crop in this month is dug up and harvested.	*Uhi boët* ..	Same operations.
Madai böot	Month of fogs and heavy rains from the sea.	*Uhi kiik* ..	Same operations.
Madai kiik	Less rain; little possible to be done these two months.	*Lakubutik*	Same operations.

(Suluki) Bibiçuçu.		Samoro.	
Lakubutik böot ..	Still showery	*Madai* ..	Same operations.
Lakubutik kiik ..	Very hot. In this month, after great offering to the *Luli*, search is made for gold, and continued only during this month.	*Funu* ..	Same operatiods.
Lëet	Hot month. Grass is burned, and preparations made for planting the Indian corn.	*Lëet Manu-luk* ..	Same operations.

There are thus twelve months, which they reckon by moons, in their years. How many days there are in a moon they did not seem to know, for the number was variously give as sixteen to thirty-five

II.—Dialects *spoken in Eastern Timor*.

In the different districts of Timor, different dialects (or (?) languages) are found to be spoken. The following is a list of the names of those said to be spoken in the region traversed by me, with the districts in which they are spoken :—

Mambia or Kaladi ..	in	Turscain; Motaël; Hermera; Kaimauk; Hera; Laicor.
Tetu (more or less the *lingua franca* of E. Timor)	„	Bariqué; Bibiçuçu; Allas; Suai; Hera; Saluki; Laclubar; Bailobo; Cotubaba.
Idate	„	Cairui; Laclubar; Mantutu; Viqueque.
Lakalé	„	Bibiçuçu; Kimauk; Vemasse; Barique; Allas; Samoro.
Haukenke	„	Lalea; Vemasse; Mantutu; Fatumarto; Vinilale.
Veke	„	Bailobo.
Vaiqueno	„	Cova; Suai.
Galolo	„	Hera; Laculo; Motaël; Lalea; Mantutu; Luga; Vemasse.
Marai	„	Manufahi; Rameau; Rolule.
Manobai	„	Allas; Samoro; Tituluru; Turscain.
Kemak	„	Bailobo; Cora; Samir; Cutobaba; Kailakuk; Attesabe; Boibau; Diribate; Lameiau; Maheibo.
Tocudade	„	Boibau; Liquiça; Maubara.
Dagada	„	Lalea; Faturo; Sarau.
Macassai	„	Luga; Vemasse.
Naubete	„	Luca.
Meadik	„	Faturó; Luga; Sarau.

III.—*Vocabulary of three of the above dialects, the* KALADI, *the* TETU, *and the* LAKALE :—

	Kaladi.	Tetu.	Lakale.
accuser	..	matenek	
ache	..	moras	banas
acquaint	..	fohatené	autada
add	tantanbarak		
advance	..	lauluk	
afraid	..	kamtauk	amtauk
aged	..	katuas	maitu
all	..	hothotu	tilirlama
allow	..	hohuk	
angry	..	hirus	bisemirus loi
animal	..	kudakarau kudawarak	
ankle	..	aifuku	
ant	..	nehek	nehek
arm	..	lima	aulimak
ashes	..	aikesa	waiahu
ask	..	husu	
assert	..	sulung	
attack	..	labelle halistori	
avenge	..	loronseluk ossi scheré	
baby	..	lavarik nurak	tiukwang
back	..	kotuk	kotuk
backbone	..	kotuk	
bad	..	istori pegté	istori
bag	..	kohe	
bamboo	..	au ; fafulu (small bamboo)	
banana	..	hudi	
banish	..	disterra (Portug.) bahu	
bark	..	aikulit (tree) asungeri (dog)	
bat	..	niki	
bathe	..	heris	riüs
battle	..	hotudar	
beak	..	munu	
beard	..	hassa rahun	
beat (drum)	..	heré	
beeswax	..	lilin	
begin	..	foinhala	
behead	..	taulu	
behind	..	kotuk	
belly	..	kabu	
beneath	..	karaik	akardebom
bid	..	orde (Portug.)	
big	..	löot	amtun
bird	..	manufoik	manhui
birth	..	foinmoris	
bite	..	tata	
black	..	metang	metang
blade	..	tudik-ici	
bleat	..	hemé	
blind	..	mata laharè	taikré

	Kaladi.	Tetu.	Lakale.
blood	..	ran	ran
blue	hena metan	busuk	
boar	..	fahi aman	
boat	..	rokik	
body	..	ici lolong	
boiling water	..	bemanas	
bold	..	totor	
bondman	..	atta	
bone	..	riu	riu
bore	..	halukuak	
bow	..	rama	
		arrow = rama-ici	
boy	..	lavarik	
bracelet	..	puti lima	
branch (of tree)	..	uiliman	
brave		oswai / Asuwai	
bread	..	morteng	
breast	..	hiris mata	hiris mata
breathe	..	ausuhu	
bridge	..	ailetete	
bring	..	hodi	odi; odi ma (b. here).
		hodi mai = bring here	
brother	..	maluk	
brother-in-law	..	ria	
broad	..	naruk	narong
buffalo	..	karau	
build	..	halu	
burial	..	taman mati	
burn	..	ahi ha	
butterfly	..	babeba	kabeba
button	..	faro	
buy	..	dosa	
calabash	..	ohukunua	
call	..	bolu	atarkau
carry	..	foti taukabas	talui itabas
cat	..	busa	
catch	..	lako	lakon
chair	..	kadera (Portug.)	
chalk	..	ahu	
cheer	..	lorsang	lorsang
child	feto kiik; older, feto böot		
chin	..	hassa	ita hassar
clay	..	tahu	
dark	..	raikalan	
cloth	..	tais	lusa
cloud	..	aibabu	
club	..	aidona	padassi temau
coat	faru		
cocoa-nut	..	nu	
coffin	..	aibalu	aivalu
cold	..	maliri	muruk
colour	..	metang	
comb	..	sasöit	
come	..	mai	
			(are you coming? = tainte hé?
comet	..	kilat lololeting	loroleting saki

	Kaladi.	Tetu.	Lakale.
to cook	tengetu		
cough	..	mear	mear
country	..	niki	niki
courage	..	maumetang	
cradle	..	boi	
cry	..	tanis (as a child)	sero
curl	..	futufriuk	leokulu
cut	ta	tai	natessi
dance	..	imabidu	atarlebidu
dark	..	raikalau	
daughter	..	hausafeto	
day	..	lorou	lelong
dead	..	maté	atarmate
deaf	..	telundiuk	tilarkadiuk
dear	..	foleng toda	holing kas
deep	..	raikuak	larakura
depart	..	bāoua	tisoï
desire	..	haukakara	
dew	..	mahobe	mohowek
difficult	..	kole	kole
distant	..	röok	lamarong
dog	..	asu	asu
door	..	hodomata	
dream	..	mehi	steu mehi
drink	hemu	hemu	emu
drown	..	motahodi	loënodi
drum	..	baba	
drunk	..	lanu	atar lanu
dry	..	maranona	nangbut
dumb	..	pakonteng	misimirus
eagle	..	makikit	
ear	..	telu	tilar
earthquake	..	rainagtoko	lamaliklain
early	..	dadelsasang	busia
east	..	loro sait	lelo saibutak
eclipse	..	ahi hafulan	
egg	..	mantelu	mantelor
elbow	..	sikruohan	itsiur
empty	..	manuk	mauo
enough	..	toona	atarmasōi
equal	..	hanessandeh	hanessansoi
evening	..	lor kraik	
expectorate	..	kauheng	aberlolok
eye	..	mata	itu matar
face	..	oï	
fall	..	monu	
far	..	röok	lamarong
father	..	ama	itamar
fast	..	lalais	
fat	..	bokur	boür
fatigue	..	kole	
feather	..	manufulu	manuhulu
fever	..	isimanas	atar lelongpanas
finger	..	lima fuan	laman huan ici
fire	..	ahi	
fish	..	ikan	ikan
flap	..	kokoreik	kokoreik
flesh	..	naän	
flower	..	aifuan	
fly	..	lalar	lalar

	Kaladi.	Tetu.	Lakale.
follow	..	tuir	loretuir auma
foot	..	aitanlara	iwetanalala
forehead	..	retos	itretos
forget	..	haluha	italehaluasoi
fragrant	..	mori	lalemori
friend	..	{peluk (high) {nai (low)	itu pelur
froth	..	kisal	kisal
fruit	..	aifuan	aihuak
fry	..	sona	sena
full	..	nokonu	penu
fur	..	fulu	sisilita
garden	..	tos	
ginger	kinur		
give	..	foeng	hemuri
goat	..	bibi	bibi
go away	..	ba	uri; lamo
gold, coined	..	dinė	
gold, dust	..	munak	
good	..	diak	ia
grass	doŭt	duŭt	nuŭt
grave	..	raté	raté
	..	airié = pole with horns	
green	netahau modok	matak	matak
gun	..	kilat	kilat
gunpowder	..	kilat rahun	kilat rahun
hair	..	fu	
hand up	..	lolo	
hit	..	konnō	
hold (fast)	..	kaïr halresa	
hot	..	manas	
house	..	urna	
how many?	..	heera	
hunger	hamlahuma		
Indian corn	..	batai	
knife	..	taha; tudik	
large	bobōt		
leads (shot)	..	milissa	
leaf; leaves	..	katemu; aitaha	
lightning	railaka		
long	naruk		naruk
mango	..	has	
mare	..	kuda ina	
mat	viti	viti	
me	..	hau	
milk	susu		
mountain	tofo		
nephew	..	tiu	
night	..	raikalau	
pig	pahi	fahi	
post (pillar)	airing		
cross-beams to hold up roof	.. laras		
gable-posts	kakuluk		
rain	..	udan	
rat	..	mama	
red	..	hena	
rice	..	fos	
rice (in husk)	..	hari-mean	

	Kaladi.	Tetu.	Lakale.
sea	tassi	tassi	
shut	..	taka	
siri (for chewing)	malus	malus	
sleep	toba		
small	..	kiiki	
sneeze	..	kūs	
tatoo	..	hedik	
thumb	..	lima fuan böot	
thunder	..	raitarutu	
toe	..	aifuan kiiki	
toe, great	..	aifuan boöt	
verandah (floor)	..	hadak	
water	..	bē	
well, are you?	..	sien diak	
west	..	loro manu	
wet	..	{sedan mara	
	..	{sematuk	
white	..	hena mitin	
wood	..	ai	

	Tetu.	Kaladi.	Lakale.	Firaku.
1	ida	..	isa	u
2	rua	..	rua	lolai
3	tolu	..	telu	lolitu
4	haät	..	aät	phār
5	lima	..	lima	lima
6	ne	..	ne	tahu
7	hitu	..	hitu	fitu
8	walu	..	walu	palu
9	sia	..	sia	siba
10	sanulu	..	sakulu	rutu
11	sanulu resin ida	..	„ resin isa	
12	„ „ rua	..		
13	„ „ tolu	..		
20	ruanulu	ranulu	ruanulu	rudu lolai
21	„ resin ida	..		
22	„ „ rua	..		
30	tolanulu	tolulu	..	rudu lolitu
40	haätanulu	..		
50	limanulu	..		
60	neanulu	..		
70	hitanulu	..		
80	walanulu	..		
90	sianulu	..		
100	atu sida	..	atu sisa	
101	„ „ resin ida	..		
110	„ „ sanulu	..		
120	„ „ ruanulu	..		
150	„ „ lunanulu	..		
1000	rihun ida	..		

IV.—*On a new species of* Coleoptera *of the family* Cetoniidæ, *from E. Timor.* *By* Oliver E. Janson, M.E.S.

Clinteria forbesi, *sp. nov.*

Above dull black with pale ochreous-yellow spots. Head coarsely punctured, slightly shining at the sides, clypeus moderately emarginate at the apex, the convex centre and elevated margins pale ochreous. Thorax sparsely but rather coarsely punctured; a sub-quadrate spot at the anterior angles, an elongate one on each side behind, and two spots on the disk. Elytra depressed, with a sutural and several discal rows of indistinct semi-circular punctures; a large triangular patch before the middle, a bi-lobed lateral spot, a small elongate one near the suture, and a large marginal spot on the apex. Pygidium with coarse interrupted transverse striæ and a small spot on each side. Under-side and legs shining black, punctate, strigose and with sparse brown pubescence; epimera above, sides of sternum and abdomen with pale ochreous spots; mesosternal process long, obtuse and slightly oblique. Length, 13 mm. Timor.

This elegant species appears to be most nearly allied to *C. hageni*, Rits.

V.—*A List of the* organisms *found adhering to three anchors dredged up from the Bay of Menado, Celebes.* *By* S. O. Ridley, M.A., F.L.S., *and* J. J. Quelch, B.Sc., F.Z.S, *of the British Museum.*

A. *Corals.*

Dendrophyllia, sp. nov.
Phyllangia papuensis, *Stud.* Very abundant. For a valuable paper, by Mr. S. O. Ridley, *On some structures liable to variation, in the sub-family Astrangiacæ* (Madreporaria), founded on the examination of this specimen, see Journal Lin. Soc. vol. xvii. 1884, p. 359, *et seqq.*; plates. (H. O. F.)

B. *Sponges.*

Tuba muricina, *Lam.*
Pachychalina sp.
Euspongia sp.

C. *Polyzoa*—Cheilostomata.

Ætia anguina, *L.*
Microporella ciliata, *Pall.*, var. personata, *Busk.*
Lepralia pertusa, *Espr.*
Schizoporella parsevalii, *And.*
Schizotheca fissa, *Busk.*
Smithia landsborovi, *Johnst.*
Cellepora larreyi, *And.*
sp. indeterm.
cyclostomata.
Crissia holdsworthii, *Busk.*
ctenostomata.
sp. (apparently new).

D. *Hydrozoa*—Hydroida.

Tubularia indivisa, *L.*
rugosa, *D'Orb.*
Aglaophenia philippina, *Kirch.*
laxa, *Allman.*

VI.—Prodomus Floræ Timorensis ; *compiled in the Botanical Department of the British Museum.*

The flora of Timor is one of great interest, but only very limited herbaria exist of it. In preparing the following sketch of the chief collections made in the island I am greatly indebted for assistance to Mr. H. N. Ridley.

In **1699–1700** Dampier visited the islands; the few plants he collected there were described by Ray.

When in **1787**, the *Bounty*, under Captain Bligh, was conveying bread-fruit trees from Otaheite to the West Indies, the crew mutinied, and the captain, together with David Nelson, botanist of the expedition, and nineteen others of the crew were cast adrift in an open boat, near the Friendly Islands. They made their way (3600 miles) to Timor, where Nelson died in 1789. The plants he collected in the island are in the British Museum.

In October **1792**, Christopher Smith and James Wiles collected a number of plants in Timor, on their way from Otaheite in the ship *Providence*, under Captain Bligh. They took also from Timor and other Malayan islands various useful plants to introduce together with the bread-fruit trees, into the West Indies. The plants collected in this expedition are also in the British Museum.

In **1803**, Riedlé, Sautier, and Guichenot, gardeners attached to the expedition of the vessels *Naturaliste* and *Géographe*, under Captain Baudin, visited the island. The expedition started from France in 1801, and reached Timor in 1803. The plants were described by De Caisne in the *Nouvelles Annales du Muséum d'Histoire Naturelle*, and are preserved in the Herbarium Delessert and in the Paris, British, and Kew Museums.

In April of the same year Robert Brown stopped at the island for a short time on his return from the Iter Australiense. He remained in the neighbourhood of Coupang, West Timor, and made a collection of considerable extent, containing many plants of extreme interest. These, together with a manuscript list of their native names, are in the herbarium of the British Museum, and a set is also in the Vienna herbarium to which they were presented by Ferdinand Bauer, the companion of Robert Brown in his travels.

In the end of **1818**, Gaudichaud visited Timor in the voyage of the *Uranie*, and in the 'Voyage de l'Uranie,' chapter viii., gives an account of the island and its products.

In **1818–1819**, Captain King visited the island with Allan Cunningham, who made a small but most interesting collection of plants, which, with the manuscript account of his travels, are preserved in the British Museum.

In **1822**, Reinwardt returned to Europe with his collections, which are in the Leyden Museum.

In September **1825**, Captain Duperrey in the voyage of the *Coquille* visited Coupang in West Timor.

In **1828**, Zippel went in the expedition under Dr. Maklot in the *Triton* and *Iris*, to the islands, and collected a number of plants, which are preserved in the Herbarium Delessert, Paris.

In **1831**, J. B. Spanoghe, the Dutch Resident, made explorations in the west of the island, and sent his collections to Holland. The plants were published in Hooker's 'Companion to the Botanical Miscellany,' vol. i, and 'Linnæa,' vol. xv.

Early in **1840**, D'URVILLE touched at Coupang in the voyage of the *Astrolabe*, and with HOMBRON collected some plants.

In **1843**, CAPTAIN SIR EVERARD HOME collected a few plants in Timor on his way home from China.

Mr. A. R. WALLACE, in his celebrated travels in the Archipelago, resided in several parts of Timor, but though devoting himself almost exclusively to the zoology of the island, he found time to make a small collection of grasses, which are preserved in the Kew Herbarium.

Mr. J. E. TEYSMANN devoted a long life to the botanical investigation of the islands of both the Indo- and Austro-Malayan regions. In his collecting tours on behalf of the Botanical Gardens, Buitenzorg, extending over a period of nearly half a century, from about **1830–1880**, he visited Timor on more than one occasion. His herbarium is preserved in the Museums of both Leyden and Buitenzorg.

Mr. J. G. F. RIEDEL, at one time Dutch Resident in Coupang, West Timor, sent to the Botanical Museum in Dresden a collection of plants, of which a small number were communicated in 1879 to the Kew Herbarium by Dr. Meyer.

THE AUTHOR'S herbarium, from which the new species enumerated below are described, was made in the eastern portion of the island, from December **1882** to May **1883**.

The various localities where collections were made, are given here in the order in which they were visited. A traverse survey was kept up throughout the journey; but, owing to the extreme inaccuracy in all existing available maps of several of the initial points of observation on which the rest of the traverse depends, it has been found impossible to lay down my route. Only when a map representing with accuracy the various positions of the heights and capes of the neighbouring islands of Kambing, Wetter, and Allor, has been made, can my geographical observations be utilised.

1. FATUNABA HILLS.—My camp was pitched at an elevation of 1700 feet on these hills, situated a few miles due south of Dilly, and collections made from Dec. 19, 1882, to March 30, 1883. Excursions were made all round the neighbourhood.

2. ERLURA.—My camp, 30th March, 3475 feet above sea level; a long day's march on my way to the interior from Fatunaba, situated with the peak of Illimanu Cape bearing N. 64° E. and the peak of Pulo Kambing N. 13° W.

3. FATETE.—Halting-place on the 31st March, on the W. side of the wide valley of the Komai.

4. LIGIDOIK.—Our halting-place on the 1st April, 3350 ft. on the other side of the valley. By prismatic compass Fatete bore N. 45° W.; Cape Illimanu N. 44° E. and Kabalaki peak W. 48° S.

5. SAUO.—Camp of April 2nd, in the valley of the Wai Matang Kaimauk, 3200 ft., Turskain peak bearing S. 18° E.

6. TURSKAIN.—Camp from April 3rd to 6th, 4000 feet above the sea. Situation: Ligidoik bearing N. 24° W.; Pulo Kambing peak, N. 16° W.; Kabalaki peak, S. 47° W.

7. BIBIÇUÇU, Rajah's of.—Camp 3000 feet, from April 6th to 22nd. Situation. Kabalaki peak bearing S. 75° W.; Luca Cape, S. 85° E.; Mount Sobale, N. 40° E.

8. SALUKI, in the kingdom of Bibiçuçu.—3400 ft. April 22nd to 26th. Situation: Kabalaki peak bearing S. 70° W.; Barique Mount, E. 1° S.

9. KAILAKUK, in the kingdom of Bibiçuçu.—2100 ft. April 26th to 28th. Situation: Kabalaki peak bearing W. 10° S.; Mount Sobale, N. 3° W.; Mount Tahäolat, N. 78° W.

10. Samoro.—April 28th to May 3rd. (*a*) Rajah's of, 900 ft. Situation: Mount Sobale bearing N. 63° W.; Barique Mount, S. 62° E. (*b*) Sobale Mount, 5000 ft. to 6000 ft. Situation: Cape Illimanu bearing N. 5° E.; Mount Barique E. 35° S.; Wetter Island summit N. 11° W.

11. Laclo.—A village not far inland from the mouth of the river of the same name, near Cape Illimanu. I camped here on the 5th May.

Note.—*The numbers after a plant—for example:* 3610, **7**—*indicate the number in my herbarium,* 3610, *and the station,* **7**, *where the plant was found.*

Polypetalæ, by J. Britten, F.L.S.

Ranunculaceæ.

Clematis Leschenaultiana, *DC.*
biternata, *DC.*

Magnoliaceæ.

Michelia Champaca. *L.*
velutina, *Bl.* ?

Anonaceæ.

Uvaria timorensis, *Bl.*
glabra, *Span.*
Mitrephora (?) diversifolia.
Anona muricata, *Dun.*
Artabotrys odoratissimus, *Br.*

Menispermaceæ.

Stephania hernandifolia, *Walp.* (S. discolor, *Walp.*), 3610, **7**; 3815, **10 b.**
Anamirta Cocculus, *W. & A.* (A. populifolius, *Miers.*)
Pachygone ovata, *Miers.*
Pericampylus incanus, *Miers*, 3626, 4045, **7.**
Menispermacea, 4014 (leaves only).

Cruciferæ.

Sinapis timoriana, *DC.* 3787, **9.**

Capparideæ.

Gynandropsis pentaphylla, *DC.* 3773, 3939, 4054, **9.**
Polanisia viscosa, *DC.* 3747, pods adhere to everything and thus get transported; **8.**
Cadaba capparoides, *DC.*
Capparis subcordata, *Span.*
trapeziflora, *Span.*
Mariana, *Jacq.*
dealbata, *DC.*
pubiflora, *DC.*
nigricans. *Span.*
sepiaria, *L.*
elliptica, *Span.*
sp. (bud). 4024.

Violaceæ.

Viola Patrinii, *DC.* 3491, **6.**
Ionidium enneaspermum, *Vent.* "Timor?"
Alsodeia macrophylla, *Dene.*

Bixineæ.

Xylosma fragrans, *Dene.*

Pittosporeæ.

Pittosporum timorense, *Bl*

Polygaleæ.

Polygala persicariæfolia, *DC.* 3185, **2.** 3887 a between **10** and **11.** 3944, **6.**
ruta, *Span.*
humilis, *Span.*

Caryophylleæ.

Drymaria cordata, *L.* 3910, **6.**

Portulaceæ.

Portulaca quadrifida, *L.*

Elatineæ.

Elatine ammannoides, *W. & A.*

Guttiferæ.

Garcinia timorensis, *Span.* "Mihi ignota," *Miq.*
Mesua ferrea, *L.*

Malvaceæ.

Malva timorensis, *DC.*
Malvastrum ruderale, *Miq.*
spicatum, *A. Gr.* (R. Brown.)
Sida cistiflora, *Bl.*
javensis, *Cav.*
humilis, *W.*
subcordata, *Span.*
rhombifolia, *L.* 4067, **11.**
paucifolia, *DC.*
acuta, *L.* 3549, **6.**
retusa, *L.* 3665, **7.**
Abutilon asiaticum, *Don.*
crispum, *Don.* (R. Brown.)
Guichenotianum, *Dene.*
timorense, *Dene.*
indicum, *W. & A.* 3886, **11.**
graveolens, *W. & A.* 4016, **11.**
Urena multifida, *Car.* 3669, **7**; R. Brown, Coupang.
Malachra horrida, *Miq.*
Pavonia cernua, *Miq.*
Thespesia Lampas, *Dalz.* 3138, 4010, **1.**
populnea, *Car.*
Hibiscus tiliaceus, *L.* 3617, **7.**
Rosa-sinensis, *L.*
timorensis, *DC.*
virgatus, *Bl.*
tubulosus, *Cav.*
Sabdariffa, *L.*
vitifolius, *L.*
surattensis, *L.* 3817, **10 b.**
pungens, *Roxb.* 3628, **7.** 3858 and 3579, **10 b.**
radiatus, *Cav.* (fol. integr.) 3780, **9.** 3879, in part, **10 b.**
ficulneus, *L.* (R. Brown, Coupang.)

Sterculiaceæ.

Helicteres Isora, *L.* 3126, **1.** Flanks of Lills, 1930 ft. clayey soil. 3799, **9.**
Sterculia urceolata, *Sm.* "Timor?"
Abroma fastuosa, *Br.*
Buettneria flaccida, *Span.*
Melochia acutangula, *Span.* "Stirps dubia."
Riedleia tiliæfolia, *DC.*
corchorifolia, *DC.*
Melhania incana, *W. & A.*

Tiliaceæ.

Corchorus acutangulus, *Lam.*
olitorius, *L.*
Triumfetta rotundifolia, *Lam.*
graveolens, *Bl.* 3705, 3908, **7.**
angulata, *Lam.*
pseudo-angulata, *Bl.* "Timor?"
sp. 3576, **6.**
rhomboidea, *Jacq.* 4090.
Grewia tomentosa, *Juss.* "Timor?"
multiflora, *Juss.* 3727, **8.** 3932, **9.**
inæqualis, *Bl.* "Timor?"
columnaris, *Sm.* 3782, **9.**
Elæocarpus cyaneus, *Linn.*
parviflorus, *Span.*
sp. (cf. E. rivularis, *Vieill.*). 3677, **7.**

Malpighiaceæ.

Ryssopterys, sp. 3647, **7.**
sp. 4086, 3758, **8.**
microstema, *Juss.* "Timor?"
timorensis, *Bl.*
Hiptage Madablota, Gaertn. 3917, **7.**

Zygophylleæ.

Tribulus terrestris, *L.*, var. moluccanus. *Bl.*

Geraniaceæ.

Impatiens Balsamina, *L.*
hirsuta, *Steud.* (Span.)
minutiflora, *Miq.* ,,
sp. nov. Kew Herb.
platypetala, *Lindl.* 3503, 3922, between **5** and **6.**
Geranium adline, *W. & A.* 3818, **10 b.** 3500, between **3** and **4.**
Averrhoa Carambola, *L.*
Bilimbi, *L.* (R. Brown.)
Oxalis corniculata, *L.* 3488, **1.** 3507, **6.** 4027, 3958 a, **7.**

Rutaceæ.

Zanthoxylon alatum, *Roxb.*, var. exstipulata. 3653, **7.** Z. timoriense, *Span.*
Evodia lotifolia, *DC.* 3620, **7.** 3851, **10 a.**
sp. n.? 3870, **10 b.**
Micromelum pubescens. *Bl.* 3612, **7.** 3697, **7.**
Triphasia monophylla, *DC.*
trifoliata, *DC.*
Glycosmis pentaphylla, *Colebr.*
Murraya exotica, *L.*
heptaphylla, *Span.*
Cookia punctata, *Retz.*
Clausena excavata, *Burm.*
(?) timorensis, *Roem.*
Citrus Limetta, *Risso.*

Simarubeæ.

Harrisonia Brownii, *A. Juss.*
Brucea glabrata, *Dene.*

Ochnaceæ.

Gomphia magnoliæfolia, *Span.* } "Adhuc incognitæ," *Miq.*
Castela lævigata, *Zipp.* }

Burseraceæ.

Canarium microcarpum, *W.*
Garuga floribunda, *Dene.*

Meliaceæ.

Melia Candollei, *Juss.*
Turræa pinnata *Span.*
Amoora timorensis, *W. & A.*
Epicharis speciosa, *Juss.*
(?) setosa, *Span.*
Xylocarpus granatum, *Kœn.*

Olacineæ.

Cansjera timorensis, *Dene.*

Celastrineæ.

Celastrus stylosa, *Wall.* 3829, **10 b.**
Enonymous javanicus, *Bl.* β. timorensis.
Elæodendron ellipiticum, *Dene.*
Salacia patens, *Dene.* 3804, 4075, **10 b.**
Hippocratea pauciflora, *DC.*
? cassinoides, *DC.*
rigida, *Span.*

Rhamneæ.

Zizyphus celtidifolius, *DC.*
timoriensis, *DC.*
Jujuba, *Lam.* 4013, 4020, **11.**
Berchemia pubiflora, *Miq.*
B.? sp. 3819, 3856, **10 b**
Colubrina asiatica, *Br.*
Gouania leptostachya, *DC.?* 3684, **7.**

Ampelideæ.

Vitis indica, *L.* "Timor"?
cordata, *Wall.* (*Benth.*). 3753 bis, **8.**
adnata, *Wall.* 3459, **1.**
discolor, *Dalz.* 3592, **7.**
(Cissus timoriensis, *DC.*)
(„ lævigata, *Bl.*)
(„ aculeata, *Span.*)
(„ coriacea, *DC.*)
(„ arachnoidea, *Hassk.*)
(cf. Cissus mutabilis, *Bl.* ex descr.) 4043, **10 b**
(cf. V. tomentosa, *Heyne.*) 3450, 3467, **1.**
sp. 3739, **8.**
sp. 3644, **7.**
Leca rubra, *Bl.* 3439, **1.** 3895, 3896.
sp. 4082.
æquata, *L.*
sp. 3622, **7.**
sp. 3662, **7.**

Sapindaceæ.

Pometia tomentosa, *Kurz.* β. cuspidata, *Bl.*
Scorododendron pallens, *Bl.* (Erioglossum alliaceum, *Span.*)
Cupania mutabilis, *Miq.*
Ratonia sp. 3779, **9.**
Spanoghea ferruginea, *Bl.*
Harpulia cufanioides, *Roxb.*
Schleichera trijuga, *Iv.* 4006, **1.**
Erioglossum edule, *Bl.* β. fraxinifolium.
Allophylus Cobbe, *Bl.* 3648, **7.**
Cardiospermum Halicacalum, *L.* 3682, 4087, **7.**
Atalaya salicifolia, *Bl.*
Dodonæa angustifolia, *Bl.*

Anacardiaceæ.

Semecarpus longifolia, *Bl.*
Buchanania longifolla, *Span.*
Mangifera timorensis, *Bl.*
indica, *L.*
Spondias lutea, *L.*

Connaraceæ.

Connarus Spanoghei, *Bl.*

Leguminosæ.

Tephrosia timoriensis, *DC.*
rigida, *Span.*
Indigofera cordifolia, *Heyn.* (Wiles and Smith.)
linifolia, *Retz.* 3513, between **5** and **6**; on rocky spots, ascending to Kaimauk, 3500 ft.
viscosa, *Lam.*
trifoliata, *L.*, var. timorensis.
Psoralea stipulacea, *Dene.*
Gaudichaudiana, *Dene.*
Crotalaria calycina, *Schrank*, 3887, between **10** and **11**.
verrucosa, *L.* 3578.
prostrata, *Roxb.*
juncea, *L.*
laburnifolia, *L.*
medicaginea, *L.* 3153, 4112, **1**.
Sesbania grandiflora. 3752, **8**.
ægyptiaca, *Pers.*
Æschynomene indica, *L.*
patula, *Pers.*
(?) atro-purpurea, *Span.*
Stylosanthes mucronata, *W.*
Smithia ciliata, *Royle.* 3512, **6**. 3909, 4068, **7**.
sensitiva, *L.*
Zornia angustifolia, *Sm.*
reticulata, *Sm.* β. subglandulosa.
zeylonensis, *Pers.* γ. gibbosa.
diphylla, *Pers.* 3499, **6**.
Desmodium triflorum, *DC.* 4073, 3395 a, **7**.
pulchellum, *Bth.* 4009.
timoriense, *DC.*
concinnum, *DC.*
latifolium, *DC.* β. Telfairii, *W. & A.*
gangeticum, *DC.* 3790, **9**.
triquetrum, *DC.* 3421, 3449, **1**; 3456, [illegible]
latifolium, *DC.* 3471, **1**; 3718, **8**.
polycarpum, *DC.* 3153 (part) **1**.
Scalpe, *DC.* 3936.
sp. 4060, 4102.
Dendrolobium umbellatum, *W. & A.* 4011, 4023.
cephalotes, *Bth.*
Uraria lagopoides, *Desv.* 3152, **1**.
picta, *Desv.*
crinita, *Desv.*
Pseudarthria viscida, *W. & A.*
Lourea vespertilionis, *Desv.*
obcordata, *Desv.*
Lespedeza sericea, *Miq.* 3557, **6**.
Abrus precatorius, *L.*
Dumasia villosa, *DC.* 3857, 3873, **10 b**.
Mucuna gigantea, *DC.*

Canavalia obtusifolia, *DC.*
virosa, *W. & A.*
gladiata, *DC.*
Glycine labialis, *L.*
Soja hamata, *Miq.* "Timor?"
Alysicarpus vaginalis, *DC.*
bupleurifolius, *DC.*
longifolius, *W. & A.*
styracifolius, *DC.*
Phylacium bracteosum, *Benn.* 3052, **7.**
Phaseolus lunatus, *L.*
Vigna Catiang. 3672, **7.**
lobata, *Endl.*
lanceolata, *Benth.* 3512, **3.**
Dolichos falcatus, *Klein.* 3529, 3536, 3541, **6**; 3810, **10 b.**
Lablab, *L* 3749, **8.** "Kutu" and "Aha," are the native names. Seeds eaten by natives after four times boiling in fresh waters.
Cajanus indicus, *Spreng.*
Atylosia scarabæoides, *Benth.*
Sophora glauca, *Lesch.*
Brachypterum timorense, *Benth.*
Derris uliginosa, *Benth.*
Spanogheana, *Bl.*
Pongamia glabra, *Vent.*
Dalbergia pubinervis, *Span.* "Species dubia, *Miq.*"
Flemingia strobilifera. *Br.*
lineata, *Roxb.*
Pachyrhizus angulatus, *Mich.* 4110.
Rhynchosia sericea, *Span.*
medicaginea, *DC.*
Candollei, *DC.*
minima, *DC.*
Eriosema chinense, *Vog.* 3130, **1.**
Cæsalpinia Nuga, *Ait.*
ferruginea, *Dene.*
pulcherrima, *Sw.* 4022.
sepiaria *Roxb.?* 3793, **9.** Climber covering great stretches of the forest with its bright orange flowers.
Mezoneuron glabra, *Desf.*
pubescens, *Desf.*
Cassia mimosoides, *L.* (R. Brown, Coupang). 3473, **1**; 3497, **2.**
Fistula, *L.* 3890, **10 a.**
megalantha, *Dene.*
exaltata, *Reinw.* (sp. dubia.)
Absus, *L.* 3477, **1.**
occidentalis, *L.?* (R. Brown, Coupang.)
Sophora, *L.* (R. Brown, Coupang.) 2480, 3303, 4098, **7.**
Tora, *L.* (R. Brown, Coupang.) 3602. **7.**
timorensis, *Deene.* (R. Brown, Coupang.) 3719, **8.**
Bauhinia ampla, *Span.*
racemosa, *Lam.*
Tamarindus indicus, *L.* 3132, **1.** Native name, "Ru."
acida, *Reinw.*
sp. (cf. B. glauca, *Wall.*) R. Brown.
Cynometra cauliflora, *L.*
bijuga, *Span.*
Desmanthus trispermus, *Span.* "Forsan Neptunia." *Miq.*
Acacia Farnesiana, *Willd.* (R. Brown.)
tomentella, *Zipp.*
quadrilateralis, *DC.*
Albizzia procera. *Benth.* 3595, **7**; 3770; **9.**

Albizzia lebbekoides, *Benth.*
stipularis, *Boiv.* 3683, 4038, **7.**
Pithecolobium umbellatum, *Bth.*, β. moniliferum.
? laxiflorum, *Bth.*
Inga petrocarpa, *Span.* (sp. dubia.)

Rosaceæ.

Rubus rosæfolius, *Sm.* 3-74, **10 b**; 3518, **6**,
sp. 3502, **6**; 3913, 4026, **6**.
sp. 3524, **6**.
Grangeria borbonica, *Lam.*
Prunus laurifolia, *Dene.*
Eriobotrya japonica, *Lindl.*
Pygeum sp. 3680, 3905, **7.**

Saxifragaceæ.

Polysoma ilicifolia, *Bl.* 3843, **10 b.**

Cucurbitaceæ.

Trichosanthes bracteata, *Voigt.*
Momordica Charantia, *L.* β abbreviata 3764, **9.**
Luffa cylindrica, *Roem.*
β. insularum, *Cogn.*
Citrullus vulgaris, *L.* (Cucumis dissectus, *Dene.*)
Coccinia cordifolia, *Cogn.* (C. indica, *W. & A.*) 4021, **7.**

Crassulaceæ.

Bryophyllum calycinum, *L.* 3736, **6.**

Rhizophoreæ.

Carallia timorensis, *Bl.*

Droseraceæ.

Drosera lunata, *Ham.* 3420, **1**; on rocky spots on red clayey soil, 2500 ft.
Not common below 2000 ft. 3519, **6.**

Combretaceæ.

Terminalia microcarpa, *Dene.*
Lagunclaria lutea, *Gaud.*

Myrtaceæ.

Eucalyptus alba, *Reinw.* 3551, **1.**
obliqua, *Herit.*
Jambosa alba, *Rumph.* δ. timorensis.
Syzygium obovatum, *DC.* "Timor?"
timorianum, *Dene.*
Eugenia Smithii, *Poir.* (Acmena floribunda, *DC.*) R. Brown.
Barringtonia timorensis. *Bl.*
Planchonia timoriensis, *Bl.*, β. alata.
Psidium pomiferum, *L.* 3733, **8.**
Decaspermum paniculatum, *Kurz.* 3670, **7.**
sp. 3585, **7**; 3859, 3838, **10 b.**

Melastomaceæ.

Memecylon pauciflorum, *Bl.* 3598, **7.**
Osbeckia chinensis, *L* 3550, **6**; 4046, 3912. **10 b.**
Melastoma malabathricum. 3506, **6**; 3822, 3894, **10 b.**

Lythrarieæ.

Suffrenia dichotoma, *Miq.*
Hapalocarpum indicum, *W. & A*
Pemphis acidula, *Forst.*
Lawsonia alba, *Lam.*
Grislea tomentosa, *Roxb.*
Woodfordia floribunda, *Salisb.* 3425, **1.** Common on the ridges of the hills from 1500–2500 ft.

Onagrarieæ.

Jussiæa angustifolia, *Lam.*
suffruticosa, *L.*
repens, *L.*

Samydaceæ.

Casearia hexagona, *Dene.*
β. gelonioides, *Bl.*
ramiflora, *Dene.*

Passifloreæ.

Disemma timoriana, *Miq.*
Herbertiana, *DC.*
Modecca populifolia, *Zipp.*
Passiflora moluccana, *Bl.* 3732, 9.

Cucurbitaceæ.

Trichosanthes bracteata, *Voigt.*
Momordica charantia, *L.*, β. abbreviata. 3764, 9.
Luffa cylindrica, *Roem.*, β. insularum, *Cogn.*
Citrullus vulgaris, *L.* (Cucumis dissectus, *Dene.*)
Coccinia cordifolia, *Cogn.* (C. indica, *W. & A.*) 4021, 7.
Melothria Rauwenhoffii, *Cogn.* (Zehneria deltoidea, *Miq.*) 3157, 1.
heterophylla, *Cog.* 3685, 7; 3627, 7.
maderaspatana *Cogn.* (Bryonia scabrella, *Ser.*)
Muellerargia timorensis, *Cogn.*
Gynostemma? hederæfolia, *Cogn.* (Sicyos Lederæfolius, *Dene.*)
Zanonia indica, *L.*
Alsomitra sarcophylla, *Ræm.*
timorana, *Ræm.* (Zanonia, *Span.*) "Non satis nota."

Begoniaceæ.

Mezierea salaziensis, *Gaud.* (Diplodinium? timorense, *Miq.*)
Begonia sp. 3863, 10 b. cp. preceding.

Ficoideæ.

Sesuvium (Pyxipoma) polyandrum, *Fenzl.*
Glinus lotoides, *Læfl.*
Mollugo striata, *L.*
oppositifolia, *L.* 3713, 7; 4109.

Umbelliferæ.

Anethum graveolens, *L.*

Araliaceæ.

Heptapleurum verticillatum, *Miq.*
Arthrophyllum (Nothopanax?) pinnatum, *Miq.*
Delarbrea paradoxa, *Vieill.* 3641, 4042, 7; 3662, 7; 3756, 8; 3859, 10 b.

Gamopetalæ, by W. Fawcett, B. Sc., F.L.S.

Caprifoliaceæ.

Viburnum Forbesii, *Fawc.* (nov. sp.). 3587, 3589 (part.). Tahaolat Mount. 5000 ft. between 6 and 7; 4010, 4089, 7. Foliis oppositis petiolatis elliptico-lanceolatis acuminatis, basi acutis integris membranaceis glabris in axillis venarum subtus barbatis, venis utrinque 3-4 prominulis; cymis breviter pubescentibus fructiferis glabrescentibus corymboso-umbellatis terminalibus foliis triplo brevioribus, bracteis et bracteolis linearibus deciduis; floribus omnibus conformibus; calyce breviter pubescente, dentibus 5 brevibus inæqualibus integris aut irregulariter dentatis; corolla parva campanulato-rotundata glabra, lobis 5 tubum æquantibus obtusis; stylo brevi, stigmatibus 3–4 parum coalitis obtusis; drupa uniloculata compressa elliptica; semine endocarpio conformi.

Foliorum laminæ impunctatæ 10–14 cm., petioli $1\frac{1}{2}$–$2\frac{1}{2}$ cm. Bracteæ $2\frac{1}{2}$–3 mm., bracteolæ 1–$1\frac{1}{2}$ m. longæ Corolla 2 mm. longa. Drupa 7 mm. longa, 5–6 mm. lata.

This species appears to be near to *V. Zippelii*, Miq.. *V. punctatum*, Ham., but differs in the leaves and the indumentum of the calyx.

Viburnum (sp., aut var. præc.?) foliis ovato-lanceolatis acuminatis basi obtusis; drupa obovata (flores non vidi). 3872, **10 b.**

Compositæ.

Vernonia cinerea, *Less.* 4059, **1.**
var. erigeroides. (R. Brown, Coupang.).
var. ζ. *DC.* (V. parviflora, *Reinw.*). (R. Brown, Coupang.)
Elephantopus scaber, *L.*
Adenostemma viscosum, *Forst.* (R. Brown, Coupang.).
Dichrocephala latifolia, *DC.* 3537. 4066, **6.**
Microglossa volubilis, *DC.* 3621, **7.**
Baccharis? arborea. *L.*
Blumea tenella, *DC.* (Timor only; see note on Timor species of Blumea, by C. B. Clarke, in 'Fl. Brit. Ind.' iii. 671.)
fasciculata, *DC.* (excl. sp. Birman.).
timorensis, *DC.*
laciniata, *DC.* (B. cichoriifolia, *DC.*)
sessiliflora, *Decne.*
acutata, *DC.*
viminea, *DC.*
balsamifera, *DC.* 3498, **2**, and at Kilehoho, 3100-4000 ft. between **2** and **3.**
Wightiana, *DC.* (Timor, Teysmann; see Martelli in 'N. Giorn. Bot. Ital.' xv. 290.)
Pluchea indica, *Less.*
Sphæranthus africanus, *L.* (S. microcephalus, *DC.*)
Monenteles redolens, *Labill.*
tomentosus, *Schz. Bip.* (R. Brown, Coupang.)
Gnaphalium luteo-album, *L.* 3943, between **2** and **3**; 4025, **6.**
Wedelia calendulacea, *Less.* (R. Brown, Coupang.) 3497, valley of Erlihumauberek, 3500 ft. April. 3848, **10 a.**
Wollastonia moluccana, *DC.* (Wedelia, *B. & H.*) 3928, **6** (also specimen with 3567).
asperrima, *Decne.*
glabrata, *DC.*
Wedelia biflora, *Hook. f.* (Wollastonia scabriuscula, *DC.*) 3567, **6.**
Bidens pilosa, *L.* (R. Brown, Coupang.) 3488, 3489, **2**; 3595, **6**; 3704 a, **7.**
Tagetes patula, *L.* 3559. In abundance by the sides of stream below Turskain, 3000 ft.; distant from any habitation. (Native of Mexico.)
Chrysanthemum coronarium, *L.* Cultd.; native of Mediterranean regions.
Centipeda orbicularis, *Lour.* 3667, **7.**
Erechthites quadridentata, *DC.*
Emilia sonchifolia, *DC.* 3443, **1**: 3493, 3955, **6.**
Senecio appendiculatus, *Less.* (*fide* Decaisne; "endemic" in Mauritius, J. G. Baker.).
Lactuca lævigata, *DC.* (Aracium lævigatum, *Miq.*) 3706, **7.**

Rubiaceæ.

Nauclea grandifolia, *DC.*
glandulifera, *Span.*
sericea, *Span.*
sp.; 3769, **9.**
Hymenodyction timoranum, *Miq.* (Cinchona timorana, *Span.*)
Dentella repens, *Forst.* (R. Brown's list, Coupang).
Argostemma timorense, *Benn.* (R. Brown, Coupang.)
Oldenlandia paniculata, *L.* 3797; **9.** (R. Brown, Coupang.)
sp., flowers white. 3547. **6.**
alata, *Ken.* (pterita, *Miq.*).
Ophiorrhiza tomentosa, *Jack.* 3934, **9.**
Mungos, *L.* (R. Brown, Coupang; "Nama.")

Mussænda frondosa, *L.* 3433, **1.**
Randia maculata, *Span.*
Fernelia buxifolia, *Lam.* Var. timorensis, *Decne.* F. buxifolia occurs only in Mauritius and Rodriguez.
Guettarda speciosa, *L.* (R. Brown's list, Coupang.)
Timonius Rumphii, *DC*; 3659, **7.** *Var.* 3436, 3906 (with 3346), **1.**
Knoxia corymbosa, *Willd.* 3523, 4028, 4069, **6.**
Canthopsis pubiflora, *Miq.* (Endemic monotypic genus.) A. Cunningham, 514.
Ixora timorensis, *Decne.* (Pavetta timorensis, *Miq.*). 3798, **9.** 4076, **7.** (found also in Australia).
coccinea, *L.* (Sir E. Home, Coupang.)
IXORA GRACILIS, R. Br. mss. (R. Brown and D. Nelson, Timor, Herb. Banks.)—Stipulis basi connatis dilatato-ovatis abrupte et longiter cuspidatis, persistentibus; foliis glabris petiolatis lanceolatis aut ovali-lanceolatis utrinque acutis aut apice subacuminatis, 6–15 cm. longis, supremis sæpe parvis basi rotundatis, membranaceis, nec nigris siccatis, venis pluribus patulis tenere venulosis; corymbis terminalibus gracilibus trichotome ramosis laxis, 12–16 cm. altis, 12 cm. latis, pedicellis brevissime pubescentibus corollæ tubo brevioribus, bracteolis parvis subulatis; calyce brevissime pubescente, dentibus 4 brevibus triangulari-ovatis acutis; corolla glabra, tubo angusto 11–14 mm. longo, laciniis 4 ellipticis acutis 8 mm. longis; staminibus 4 exsertis; stylo parum exserto, ramis 2 brevibus acutis reflexis; bacca 6–7 mm. lata, pyrenis 1 aut 2. The flowers are quite unlike those of *I. nigricans*, as the tube is more slender, and the limb in bud is more than twice as broad.
IXORA QUINQUIFIDA, R. Br. mss. (D. Nelson, Timor, in Herb. Banks.).—Stipulis basi connatis triangularibus cuspidatis deciduis; foliis glabris breviter petiolatis lanceolato-oblongis acuminatis basi subobtusis subcoriaceis, 11–21 cm. longis; paniculis terminalibus brachiatis, 9 cm. altis et latis, pedicellis glabris corollæ tubo brevioribus, bracteis parvis vix 2 cm. longis ovatis acuminatis, bracteis secondariis 7 mm. longis, bracteolis nullis aut caducis; calycis glabri dentibus brevissimis aut obsoletis; corollæ fauce barbato, tubo 10 cm. longo, laciniis 5 ellipticis acutis, 6–7 mm. longis; staminibus 5 exsertis; stylo parum exserto, ramis 2 brevibus acutis.
Pavetta indica, *L.* 3675, **7.**
longipes, *DC.*
Myonima ovata, *Decne.* (Mauritius.)
Morinda citrifolia, *L.*
Gynochtodes coriacea, *Bl.*
Psychotria montana, *Bl.* 3303, 3307, 3916, **10 b.**
barbata, *Span.*
? sp. parviflora, *Span.* (D. Nelson in Herb. Banks).
Chasalia capitata, *DC.* (Mauritius; Timor, *fide* Decaisne.)
Geophila reniformis, *G. Don.* 3715, **8.**
Pæderia fœtida, *L.* (R. Brown's list, Coupang, "Tali.")
Spermacoce stricta, *Linn. f.* (R. Brown, Coupang.) 3666, **7.**
ocymoides, *Burm.* (R. Brown, Coupang.)
hispida, *L.* (R. Brown, Coupang.)
Bigelovia sociata, *Span.*
? pumila, *Span.*
? angustifolia, *Span.*
Galium rotundifolium, *L.* 3861, **10 b**; 6000 feet; 4070, **6.** 6; 4000 feet.

Goodenoviæ.

Scævola Lobelia, *L.* (R. Brown's list, Coupang.)

Campanulaceæ.

Sphenoclea zeylanica, *Gært.*
Wahlenbergia gracilis, *DC.* On rocky exposed banks, 3511 and 4018, **3**; 3914, 4065, **7.**

Vacciniaceæ.

Vaccinium timorense, *Fauc.* (nov. sp.),—Frutex, ramulis petiolis racemis calycibu-que pubescentibus; foliis brevi-petiolatis lanceolatis utrinque acutis 22–30 mm. longis integris planis coriaceis glabris supra lucidis subtus pallidis; racemis 4 cm. longis axillaribus subsecundis, pedicellis 6–8 mm. longis; calyce 2–3 mm. longo, lobis tubi longitudine acutis; corolla 4–6 mm. longa tubulari rosea; filamentis staminum pilosis, loculis antherarum ellipticis minutissimis spinulis tectis dorso muticis in tubulos breves rectos apice apertos productis; disco epigyno pubescente extrorsum sinuato; bacca 5 mm. longa globosa glabrescente nigra. This species differs from *V. ellipticum* especially in the flat lanceolate leaves and glabrous fruits. "3423, straggling shrub; rose-coloured flowers; dark green fruit, becoming black when ripe; **1.** 3586, large shrub; flowers scarlet; Tahaolat Mt., 5000 feet; April."

β. denticulatum. "3447, large bush, flowers rose-coloured, on slopes of gorges. Foliage larger than in 3423, and margins of leaves slightly denticulate; **1.**"

Epacrideæ.

Leucopogon obovatus, *Fauc.* (nov. sp.),—Frutex erectus, ramulis pubescentibus; foliis confertis erecto-imbricatis sessilibus obovato-lanceolatis acutis, mucrone rigido terminatis, planis sæpe subconcavis, 15 mm. longis, 3 mm. latis; pedunculis axillaribus brevissimis 1- aut 2-floris; bracteis minimis; bracteolis latis obtusis, calyce dimidio brevioribus; calycis laciniis latis obtusis mucronatis ciliolatis 2½ mm. longis; corolla calycibus longiore, lobis acutis; staminibus fauci affixis, antheris obtusis; ovario 5-loculari; drupa 1- aut 2-loculari subglobosa calycibus longiore, disco hypogyno subconvexo sublobato coronata. This species resembles *L. ruscifolius*, *L. moluccanum*, *L. lancifolius*, and *L. javanicus*, but differs in several particulars, such as shape of leaves, sepals, and fruit. 3193 a. On top of Tehulah, 4000 feet; April; fruit green.

Plumbagineæ.

Plumbago zeylanica, *L.* 3778, 3778 a, **9.** (R. Brown's list, Coupang, "Akar lucca.")

Primulaceæ.

Lysimachia decurrens, *Forst.* 3501, **6.** In this specimen the stamens are not so long as the oblong corolla tubes; but this may be due to dimorphism.

Myrsineæ

Mæsa indica, *A. DC.*; 3613, 7. Var. Wightiana, *A. DC.* (*leg.* Spanoghe, fide Scheffer).

Mæsa pulchella, *Fauc.* (nov. sp.),—Foliis petiolatis glabris lævigatis nitidis integris aut glandulose remote serratis, lanceolatis utrinque acutis chartaceis; racemis basi ramosis axillaribus et terminalibus folio subbrevioribus glabris; pedicellis florem æquantibus; bracteis lanceolatis acuminatis, pedicelli triplo brevioribus; bracteolis ovato-lanceolatis ciliolatis calyce multo brevioribus; floribus pentameris; calycis laciniis triangularibus ciliolatis; corolla calyce duplo longiore, laciniis ovato-rotundatis; ovarium fere inferum.

Folia 10–13 cm. longa, 3–4 cm. lata venis primariis utrinque 4–5, secundariis obscuris. 3556, 3566, **6**; 3573, river banks, **6**; 4103, 8.

Mæsa verrucosa, *Scheff.* 3763, small tree, 9.

leucocarpa, *Bl.* ("Timor? prope Mallathoi, Reinwardt," *Scheffer*).

Ardisia Spanoghei, *Scheff.* (Spanoghe).

triangulælifolia, *Scheff.* Zipp. mss.; leg. Zipp. et Span.)

Ebenaceæ.

Diospyros timoriana, *Miq.*

montana, *Roxb.*, var. cordifolia, *Hiern*

maritima, *Bl.*

Oleaceæ.

Jasminum Sambac, *Ait.* A. Cunningham.
simplicifolium, *Forst.* R. Brown.
pubescens, *Willd.* A. Cunningham.
Chionanthus montana, *Bl.*
timorensis, *Bl.*
Noronhia emarginata, *Pet. Th.*
Nyctanthes arbor-tristis, *L.* (R. Brown, Coupang.)

Apocynaceæ.

Melodinus Forbesii, *Faurc.* (nov. sp.),—Foliis ovato-lanceolatis basi rotundatis breviter petiolatis glabris supra nitidis pergamaceis; cymis terminalibus folio multo brevioribus multifloris coarctatis, ramis pedicellisque incano-subvelutinis glabrescentibus bracteatis, pedicellis calyce brevioribus, "floribus albis fragrantibus," (H.O.F.); lobis calycinis ovatis obtusis glabris ciliatis; corolla extus subvelutina, tubo tereti intus supra stamina dense velutino, limbi laciniis oblique obovato-rotundatis parce et brevissime pilosis, fauce hispidis, squamis 10 linearibus acutis glabris superne liberis inferne decurrentibus; staminibus ad medium tubum inclusis, filamentis antherâ duplo brevioribus; ovario supra basim unicellulari, stigmatis apiculo bifido. Folia 12–14 cm. longa, 3½–4 cm. lata, petioli 5–6 mm. longi. Corollæ tubus 10 mm., limbus 6 mm. longus. 3708, **7.** This species comes near to *M. Cumingii*, but the flowers are smaller, the stamens placed higher up in the tube, and the apex of the stigma is bifid; the ovary is only partially two-celled.
Melodinus terminalis, *Span.* (undescribed; perhaps the same as the species described above).
Carissa Carandas, *L.*
Rauwolfia sumatrana, *Jack*, var. longifolia, *Bl.*
Alyxia Spanogheana, *Miq.*
Tabernæmontana orientalis, *R. Br.* 3781, **9.**
Vallaris Pergulana, *Burm.*
Parsonsia spiralis, *Wall.*
Cerbera Odallam, *Gært.*
Wrightia pubescens, *R. Br.*
calycina, *A. DC.* var. *γ. Miq.*
tinctoria, *Bl.*
timorensis, *Miq.*
Spanogheana, *Miq.*
Alstonia scholaris, *R. Br.*
spectabilis, *R. Br.*
macrophylla, *Wall.*
sericea, *Bl.*
Anodendron paniculatum, *A. DC.*
Plumeria acutifolia, *Poir.* (R. Brown's list, Coupang, "Bonge tonke.")
Vinca rosea, *Willd.* ("In hortis," Spanoghe). Abundant in river beds below Kalakuk.

Asclepiadeæ.

Cryptolepis laxiflora, *Bl.*
Secamone micrantha, *Decne.*
timorensis, *Decne.*
Calotropis gigantea, *Br.* (R. Brown's list Coupang, "Daun susu.")
Tylophora crassifolia, *Decne.* (Zipp. mms.)
villosa, *Bl.* (*fide* Zippel).
cuspidata, *Decne.* (Zipp. mss.)
Marsdenia tenacissima, *Wight & Arn.*
Pergularia odoratissima, *Sm.*
bifida, *Decne*, (Zipp. mss.)
tomentosa, *Span.* (*P. crocea*, Zipp. mss.)
Dregea volubilis, *Benth.*
Gymnema syringæfolia, *Benth.*

Gymnema albidum, *Deene.*
Dischidia orbicularis, *Deene.*
timorensis, *Deene.*
Hoya laurifolia, *Deene.*
CEROPEGIA OBTUSILOBA, *Fauc.* (nov. sp.),—Volubilis, glabra; foliis ovatis attenuato-acuminatis basi rotundatis membranaceis ciliolatis subrepando dentatis, lamina 5–7 cm. longa, petiolo 1-2 cm. longo; pedunculis foliis dimidio brevioribus, floribus 3–7 pedicellatis; calycis laciniis subulato-acuminatis 2–2½ mm. longis; corollis 1½-2½ cm. longis, tubo intus circa stamina piloso; coronæ lobis exterioribus 10 brevibus obtusis pilosis interioribus 5 longis linearibus subspathulatis. 3801, flowers dark reddish-brown; **9.**

Loganiaceæ.

Buddleia asiatica, *Lour.* 3723, **8.**
Strychnos ligustrina, *Bl.*
Mitrasacme pygmæa, *Br.* 3492, **3**; 3884, **10 b.**
trinervis, *Span.* Probably same as *M. pygmæa.*
Geniostoma montanum, *Zoll. & Mor.* 3552, **6**; 3616, 3654, 3947, **7.**

Boragineæ.

Tournefortia argentea, *L. f.* (Spanoghe, R. Brown's list, Coupang.)
sarmentosa, *Lamk.* 3835, **10 b**
Cordia subcordata, *Lamk.* (Wiles and Smith, Coupang.)
trichostemon, *DC.*
subpubescens, *Deene.* ("Kanoena," Spanoghe.)
Ehretia laurifolia, *Deene.*
timorensis, *Deene.*
buxifolia, *Roxb.*
Heliotropium indicum, *L.* (R. Brown's list, Coupang, "Daun futer.")

Convolvulaceæ.

Argyreia Reinwardtiana, *Miq.*
Guichenotii, *Chois.*
Lettsomia setosa, *Roxb.*
Ipomœa bona-nox, *L.* (R. Brown's list, Coupang.)
grandiflora, *Lamk.* 3773, **9.**
capillata, *Span.*
aquatica, *Forsk.* (δ. reptans, *Poir.*, R. Brown's list, Coupang.)
reniformis, *Chois.*
angustifolia, *Jacq.* 3754, **8.**
chryseides, *Ker.*
trichocalyx, *Steud.* (? R. Brown, Coupang.
obscura, *Ker.* 4004, **1.**
sepiaria, *Koen.*
campanulata, *L.*
cymosa, *Roem.*
petaloidea, *Chois.*
pes-capræ, *Sw.* (R. Brown's list, Coupang.)
vitifolia, *Sw.*
pumila, *Span.*
digitata, *L.*
Quamoclit, *L.* 3871, **10 b.**
repanda, *Jacq.* (Wiles and Smith. Coupang.)
Lederacea, *Jacq.* 3776, **9**; 4105, **1**; 4108, **9.** (R. Brown, Coupang.)
Hewittia bicolor, *Wight.*
Convolvulus parviflorus, *Vahl.*
Porana volubilis, *Burm.*
racemosa, *Roxb.* 4104, **1.**
Evolvulus alsinoides, *L.*
Cuscuta reflexa, *Roxb.*
monogyna, *Vahl.*

Solanaceæ.

Lycopersicum esculentum, *Mill.* (R. Brown's list, Coupang, "Mattee mattee.")
Solanum aviculare, *Forst.*
dianthophorum, *Dun*
horridum, *Dun.*
violaceum, *Br.*
verbascifolium, *L.* 3623, **7**; 3838, **10 b**; 4036, **7**.
nigrum, *L.* 3785, **9**; 3826, 3881, **10 b.**
indicum, *L.* 3841, **10 b.**
barbisetum, *Nees.*? 3634, **7**; 4008, **8**; 4096, **10.**
Melongena, *L.* 3786, **9**; 4091, **1**; flowers small, 8 lines in diameter; fruit, 1 inch.
torvum, *Sw.* 3806, **10 b.**
denticulatum, *Bl.* 3164, **1.**
Capsicum frutescens, *L.* Spanoghe.
minimum, *Roxb.*
Nicotiana suaveolens, *Lehm.*
Tabacum, *L.* H.O.F. No number.
Physalis minima, *L.*
Datura Metel, *L.*
fastuosa, *L.* 3759, **9**; 4064, **9.**

Scrophularineæ.

Mazus lævifolius, *Bl.*
gratissima, *Bl.*
Herpestis floribunda, *Br.*
Monniera, *H.B.K.*
Bonnaya brachiata, *Link & Otto.*
veronicæfolia, *Spreng.*
Buchnera arguta, *Decne.*
ramosissima, *R. Br.*
tomentosa, *Bl.* 3805, 3811, **10 b.** (R. Brown, Coupang.)
asperata, *R. Br.*

Buchnera timorensis, *Fauc.* (nov. sp.),—Pubescens, caule erecto simplici 10–23 cm. alto; foliis oppositis integris, radicalibus et infimis subrosulatis obovatis 8–16 mm. longis, caulinis oblongis et superne linearibus; spica interrupta; bracteis 2–2½ mm. longis, lanceolatis acuminatis pubescentibus calyce plus dimidio brevioribus; calyce fructifero 4–5 mm. longo, 2 mm. lato, pubescente, dentibus brevibus lanceolatis; corolla glabra 1–1¼ cm. longa, tubo calyce duplo longiore; capsulis vix exsertis. This species differs from its nearest Australian allies, and also from *B. arguta*, in the large corolla combined with small leaves and low simple stem. 3494, flowers pink; among grass on top of Kileholo; between **2** and **3**, at 4600 feet.

Buchnera exserta, *Fauc.* (nov. sp.).—Scabro-pubescens, caule erecto ramoso 7½–9 dm. alto; foliis alternis, superioribus suboppositis lanceolato-oblongis obtusis integris aut repando-dentatis; spica multiflora interrupta; bracteis ovato-lanceolatis scabris, calyce dimidio brevioribus, infimis sæpe longioribus; calyce fructifero 4–5 mm. longo, 2 mm. lato, pubescenti-scabro, dentibus brevibus triangularibus acutis; corolla glabra calycibus duplo longiore; capsulis longe exsertis. This species is remarkable for its long capsule. 3811. bis. **10 b.** (R. Brown, Coupang.)
Striga Spanogheara, *Miq.*
parviflora, *Benth.* (R. Brown, Coupang.) 3737; flowers bluish-purple, **8.**
multiflora, *Benth.* (R. Brown, Coupang.)
Torenia minuta, *Bl.* 3483, **1**; 3950, **7.**
pedunculoris, *Benth.* 3440, 4058, **1.** The flowers are somewhat smaller than in the description in 'Fl. Brit. Ind.,' the lower stamens are longer and the upper shorter than in plate 4229, *Bot. Mag.*

Scoparia dulcis, *L.* 4109.
Sopubia trifida, *Ham.* 3555, **6.**

Gesneraceæ.

Rhynchoglossum obliquum, *Bl.*
Epithema Brunonis, *Decne.*
difforme, *Span.*
Cyrtandra serrata, *Fauc.* (nov. sp.), "Arbuscula" (H. O. F.).—Foliis serratis late lanceolatis utrinque attenuatis subinæqualibus glabris, majoribus 2 dm. longis, 45 mm. latis, nervis obscure pubescentibus primariis lateralibus utrinque 8–10, petiolis 15–20 mm.; pedunculis 0–5 mm.; bracteis (? caducis); pedicellis 2–3, 2 cm. longis, umbellatim ortis; calyce fructifero 6–8 mm. longo, 5-fido, campanulato, glabro, lobis 4 mm. longis lanceolatis acuminatis; corolla . . .; ovario . . .; disco annulari; bacca ellipsoidea. Apparently near to *C. cuneata*, but differs in being glabrous, in the serrate long-petioled leaves, and the short peduncles. 3868, 3883, **10 b.**

Bignoniaceæ.

Millingtonia hortensis, *L. f.*
Dolichandrone Rheedii, *Seem.*
Colea ramiflora, *DC.*

Pedalineæ.

Josephinia Imperatricis, *Vent.*
Sesamum indicum, *DC.* R. Brown, Coupang, "Lena.")
Martynia diandra, *Glox.* 3454, and 4052, **1.** (Mexico.)

Acanthaceæ.

Thunbergia fragrans, *Roxb.* (R. Brown, and Smith and Wiles, Coupang.)
fragrans, var. lævis, *C. B. Clarke.* 3783, **9**; 3852, **10 a**; 4053, **1**
hastata, *Decne.*
Nomaphila petiolata, *Decne.*
Sautiera Decaisnii, *Nees.* (monotypic endemic genus). A. Cunningham, 320
Ruellia hirsuta, *Nees.*
Decaisniana, *Nees.*
prostrata, *Lam.*, var. dejecta, *C. B. Cl.*
Strobilanthes timorensis, *Nees.*
aspera, *Decne.* A. Cunningham.
Barleria Prionitis, *L.*
Lepidagathis humifusa, *Decne.*
javanica, *Bl.*
repens, *Decne.*
Justicia Gendarussa, *L. f.* 3774, **9.**
procumbens, *L.* 3986, **2**; 3528, **6**; 3691, **7.**
Eranthemum bicolor, *Schr.* (R. Brown, and Smith and Wiles, Coupang.)
Dicliptera glabra, *Decne.* A. Cunningham.
eriantha, *Decne.*
spicata, *Decne.*
Burmanni, *Nees.*
Peristrophe albiflora, *Hassk.*
Hypoestes rosea, *Decne.*
Asystasia chelonoides, *Nees.* (R. Brown, Coupang.)
coromandeliana, *Nees.* 4083, **8**; 4047, **7.**
Dianthera terminalis, *Fauc.* (nov. sp.).—Caule debili, inferne decumbente; foliis longe petiolatis, lanceolatis, utrinque acuminatis, sæpe basi rotundatis, supra paucissimis pilis, infra nervis pubescentibus, majoribus cum petiolo 15 cm. longis 4 cm. latis, superioribus subsessilibus 2½–5 cm. longis; paniculis terminalibus pubescentibus 5–25 cm. longis, ramis oppositis dichotomis, pedicellis brevissimis filiformibus; bracteis et bracteolis minutis, subulatis; calyce 5-partito, laciniis æqualibus subulatis, breviter glanduloso-pubescente; corolla 1 cm. longa, tubo recto; labio superiore bifido; staminibus 2 ad medium tubum corollæ affixis, non ultra summum tubum attingentibus, filamentis filiformibus; disco annulari;

capsula oblonga apice acuta tetrasperma. 3814, **10 a**; 3821, 4030, **10 b**; var. *grandiflora*, corolla 1½ cm. longo, tubo ampliato; paniculo glanduloso-pubescente. Zollinger, No. 2951, Java.

Verbenaceæ.

PETRÆA ARBOREA, *Kunth.*, Smith and Wiles.—No species of this tropical American genus has hitherto been recorded as spontaneous in the Old World, but Mr. Forbes has also met with it in Java in an undoubtedly wild state, and in great plenty (see p. 78). It is not at all improbable that it will be met with in other localities. A nearly allied genus has lately been described by Prof. Oliver in Ic. Plant. (Pl. 1420), namely Petræovitex. The only species of this genus known, *P. Riedelii*, was obtained a short time ago by Mr. Riedel's collectors in the island of Buru; but it is reported from Amboina by Rumphius (Vol. v., p. 4, t. 3) in 1747 under the name *Funis quadrijidus*, and specimens in fruit exist in Brit. Mus. Herb., collected by Christopher Smith in 1798 in Honimoa or Saparua, an island near Amboina.

Vitex trifolia, *L.*, var. unifoliata. 3726, **3.**
pubescens, *Vahl.* 4056, **1.**
Negundo, *L.* (R. Brown, Coupang, "Lagoundi.")
timoriensis, *Walp.* A. Cunningham.

CLERODENDRON PULCHRUM, *Fauc.* (nov. sp.),—Ramulis, paniculis, et petiolis brevissime tomentosis; foliis longe petiolatis cordatis ovato-rotundatis acuminatis integris repando-sinuatis, subtus strigoso-hirtellis, supra pæne glabris, majoribus cum petiolo 24–30 cm. longis; panicula terminali corymbosa; calycibus 8 mm. longis glabris, fructiferis non auctis, lobis 5 mm. longis, lanceolatis; corollis "corallinis," (H. O. F.) glabris, tubo 25 mm. longo; staminibus longe exsertis; drupa globosa 4-sulcata tenuiter succosa, pyrenibus 4 per paria cohærentibus. This is a well-marked species, with its large deeply cordate leaves, the long-tubed corolla, and calyx not enlarged in fruit. 3604, **7**; 3000 ft.; April.

Clerodendron inerme, *Gærtn.*
longiflorum, *Decne.*

Callicarpa cana, *L.* (R. Brown, Coupang; C. sp. in list, "Cadia Bousson.")
pedunculata, *R. Br.* 3465, **1.**
sumatrana, *Miq.*? 3601, **7.**

Premna timoriana, *Decne.*
corymbosa, *Rottl.*
sp. 3611, 3638, 3892, 4688; tree; fruit becoming black, **7.**

Tectona grandis, *Linn. f.* (R. Brown's list, Coupang, "Jdatti.")

Lippia nodiflora, *Rich.* (R. Brown's list, Coupang.)

Labiatæ.

Ocimum Basilicum, *L.* (R. Brown. Coupang.)
sanctum, *L.* (R. Brown, Coupang.)

Moschosma polystachyum, *Benth.*

Plectranthus parviflorus, *Willd.* (P. australis, *R. Br.*). 3888, between **10-11.**

Coleus grandifolius, *Benth.*
scutellarioides, *Benth.* (R. Brown, Coupang, "Bounga tunta.")
secundiflorus, *Benth.*

Hyptis brevipes, *Poit.* 3563.

Calamintha moluccana, *Miq.*

Scutellaria heteropoda, *Miq.* 3129. Leaves spread out on surface of ground. flowers deep cobalt blue. On ridges and crevices exposed to sun on red clayey soil; **1**; 3533, **8.**

Anisomeles canaricans, *Benth.*
ovata, *R. Br.* (R. Brown, Coupang.)
salviifolia, *R. Br.*

Leucas procumbens, *Desf.*
decemdentata, *Sm.* (Gaudichaud; R. Brown, Coupang, "Kappa Mă.")
javanica, *Benth.* (? chinensis, *Span.*, Timor).

Teucrium viscidum, *Bl.* (Java.)
β. densiflora, *Miq.* (Timor.)
Cynaria acuminata, *Decne.*

APETALÆ, by W. FAWCETT, B. Sc., F.L.S.

Nyctagineæ.

Mirabilis Jalapa, *L.* (R. Brown's list, "Bounga mattari.")
Boerhaavia repanda, *W.* (R. Brown, Coupang. This may be the species denoted in his list, as B. tetrandra, "Lei lidi.")
diffusa, *L.* 4033, **9.**
α. obtusiloba, *Chois.*
β. acutifolia, *Chois.* (R. Brown, Coupang.)
γ. pubescens, *Chois.* (B. glutinosa, *Vahl.*)
Pisonia excelsa, *Bl.*

Amarantaceæ.

Deeringia baccata, *Moq.* (D. celosioides, *R. Br.*) 3556, **7**, 4012, **1.**
Celosia cristata, *Moq.*
argentea, *L.*
Amarantus spinosus, *L.* (R. Brown's list, Coupang. "Wajang.") 3455, 3466, 3930.
mangostanus, *L.*
oleraceus, *L.*
polygamus, *Miq.* (R. Brown's list, Coupang. A. sp., "Sayal Badjang.")
Ptilotus corymbosus, *R. Br.* Timor?
Pupalia lappacea, *Moq.* (R. Brown's list, Coupang, "Bounga Makriti" and "Susoro.") 3775; **9.**
atropurpurea, *Moq.*
β. pallida, *Moq.*
Ærua sanguinolenta, *B'.*
timorensis, *Moq.*
Achyranthes tomentella. *Zipp.*
aspera, *L.* (R. Brown's list, Coupang, "Susoro" and "Kakai.")
Alternanthera nodiflora, *R. Br.*
Gomphrena globosa, L.

Chenopodiaceæ.

Arthrocnemum fruticosum, *Moq.*
indicum, *Moq.*
Salsola australis, *R. Br.*
brachypteris, *Moq.*

Polygonaceæ.

Polygonum barbatum, *L.* 3572, **6**; also with 3532.
chinense, *L.* 3532, between **5** and **6.** Turksain river, 3000 ft.
flaccidum, *Roxb.*
Rumex nepalensis, *Spr.*, var. 3539.

Aristolochiaceæ.

Aristolochia timorensis, *Decne.*

Piperaceæ.

Piper subpeltatum, *Willd.* 3904, 3657, **7.** The natives eat the leaves instead of the ordinary *siri.*
Betle, L.
officinarum, *C. DC.*
arborescens, *Roxb.* 3698; **7.**
arcuatum, *Bl.*, with 3854; **10 b.**
Peperomia tomentosa, *A. Dietr.* 3755; in clefts of rocks, **8**

Laurineæ.

Litsea timoriana, *Span.* (Tetranthera discolor, *Bl.*)
sebifera, *Pers.* (Tetranthera laurifolia, *Jacq.*)
ε. platyphylla, *Bl.*, 2424, ♂, **1**; 3636, 3891, 4074, ♀, large tree, **7**.
(Cylicodaphne) diversifolia, *Bl.* 3605, 3695 a, 3673, 4035, **7**; 3845, 3853, **10 b.**
Illigera dubia, *Span.*
Cassytha pubescens, *R. Br.*
Cinnamomum? 3655, **7.**

Thymeleaceæ.

Pimelea brevitubra, *Farc.* (nov. sp.),—Herbacea erecta, annua (?), glabra, semipedalis; foliis subspathulatis oppositis alternisve; involucris gamophyllis turbinatis 4–5 mm. latis, lobis 4 ovalibus obtusis 6 10 mm. longis, tubo 2–4 mm. longo; floribus hermaphroditis albis; pedicellis brevibus compressis ad medium tubum affixis; perianthiis involucri lobo brevioribus aut longioribus, tubo 6–7 mm. longo, angusto, post anthesin supra ovarium circumscisso, lobis obtusis 1½-2 mm. longis; staminibus 1½ mm. longis, connectivo angusto; exocarpio membranaceo; seminis superficie nigra reticulata, albumine pareo; embryonis cotyledonibus ovalibus, 1 m. longis.

This species differs from its nearest allies in the involucre as well as, in other respects, *e.g.*, from *P. cornucopiæ*, Vahl. and *P. punicea*, R. Br. in the short peduncle and general habit; from *P. concreta*, F. Muell, in the filaments; and from *P. sanguinea*, F. Muell, in the perianth. It is the only one at present described as occurring beyond the limits of Australia and New Zealand. There is a small specimen in the Br. Mus. Herb., collected on the island of Savu, near Timor, by Banks and Solander, which is very like this species in habit, but differs in the involucre, which is more like that of *P. punicea*, R. Br. 3828; flowers white; in grass. **10 b.**
Wikstroemia Spanoghii, *Decne.*
Drymispermum laurifolium, *Decne.* 4050, **9.**

Elæagnaceæ.

Elæagnus ferruginea, *Rich.*? 3570; flowers dirty white dotted with rusty red, **6.**

Loranthaceæ.

Viscum orientale. *W.*
articulatum, *Burm.*, v. timoriense, *DC.*
Loranthus longiflorus, *Desr.* 3844, flowers scarlet. **10 b.**
obovatus, *Bl.*, var. minor (R. Brown, Coupang.)
indicus, *Desr.*
trifiorus, *Span.*
pendulus, *Sieb.* 3543; parasitic on 3544; purple calyx, purple anther-tips in bud; **6.**

Euphorbiaceæ.

Daphniphyllum Zollingeri, *Muell. Arg.*? 3807, 3809, 3882, tree, **10 b.**
Dodecastemon Teysmanni, β. timorense, *Miq.*
Bridelia ovata, *Decne.*
Andrachne fruticosa, *Decne.*
Phyllanthus Casticum, *Muell. Arg.* var. 3612, small tree, **7**; var. fasciculatus.
reticulatus, *Poir.*
β. glaber, *Muell. Arg.*
maderaspatensis, *L.*
Niruri, *L.* "Taom." (R. Brown's list, Coupang.)
Urinaria, *L.* 3936.
distichus, *Muell. Arg.* "Sala melee." (R. Brown's list, Coupang.)
nobilis, *Muell. Arg.*

Phyllanthus obliquus, *Muell. Arg.*
spp. 3802, 3834.
Breynia cernua, *Muell. Arg.*
oblongifolia, *Muell. Arg.* (A. Cunningham, 317.)
sp. 3652.
Croton caudatus; α. denticulatus, *Muell. Arg.*
Codiæum moluccanum, *Decne.*
Claoxylon iridicum, *Hassk.*
Cephalocroton discolor; β. virens, *Muell. Arg.*
Gelonium glomerulatum, *Hassk.*
Mallotus moluccanus, *DC.* 3745, **8**. (R. Brown, Coupang.)
ricinoides, *Muell. Arg.* 3658; young foliage, lake-scarlet, **7**.
repandus, var. scabrifolius, *Muell. Arg.*
scandens, *Muell. Arg.* (Spanoghe, Coupang.)
Philippinensis, *Muell. Arg.* 3766, **9**.
liliæfolius, *Muell. Arg.* (R. Brown, Coupang.)
muricatus, *Muell. Arg.*
Macaranga Tanarius, *Muell. Arg.*
Acalypha integrifolia, *W.* (R. Brown's list, Coupang. A. sp. "Tataka.")
brachystachya. *Hornem.* 3574, **6**.
Alchornea javensis, *Muell. Arg.*
Cleidion javanicum, *Bl.*
Excœcaria Agallocha, *L.*
Antidesma paniculatum, *Bl.*
Stillingia sebifera, *Michx.* 3650, **7**.
Euphorbia lævis, *Poir.*
serrulata, *Reinw.*
neriifolia, *L.* (R. Brown's list, Coupang, "Laous.")
congenera, *Bl.*
thymifolia, *Burm.*
Ricinus communis, *L.* (R. Brown's list, Coupang, "Dammar Eude.")
Jatropha Curcas. (R. Brown's list, Coupang, "Dammar.")

Urticaceæ.

Sponia timorensis, *Decne.* 3720; **8**.
amboinensis, *Decne.* 3938, 3935, **9**; 3723, **8**.
Celtis timorensis, *Span.*
Fleurya cordata, *Gaudich.*
interrupta, *Gaudich.* (R. Brown, Coupang.)
Laportea peltata, *Gaudich.*
Urera acuminata, *Gaudich.* (Mauritius.)
Girardinia zeylanica, *Decne.*
Pilea lucens, *Wedd.*
Procris pedunculata, *Wedd.*
Fatoua pilosa, *Gaud.* 3671, **7**. (R. Brown, Coupang.)
lanceolata, *Decne.*
Pouzolzia lævigata, *Gaud.* Mauritius; Timor, *fide* Decaisne.
indica, *L.* (R. Brown, Coupang.)
Pipturus argenteus, *Wedd.* 3742, **8**.
incanus, *Wedd.* 3686, 4078, **7**.
Phyllochlamys spinosa, *Ed. Bur.*
Malaisia tortuosa, *Blanco.*
Ficus indica, *L.* (R. Brown's list, Coupang, "Tijka"; Gaud., "Goudas.")
religiosa, *L.* (R. Brown's list, Coupang; Gaudichaud, "Goudas."
repens, *Willd.* (R. Brown's list, Coupang.)*
Artocarpus integrifolia, *Bl.* 3777, 4024, **9**.
incisa, *L.* (R. Brown's list, Coupang.)

* The species of Ficus collected by Mr. Forbes will be noticed by Dr. G. King, of the Botanical Gardens, Calcutta, in his forthcoming illustrated Monograph on the group.

Cudrania javanensis. *Trée.* 3731; **8**.
Bœhmeria platyphylla, *Don*, var. 3911.
Debregeasia longifolia, *Wedd.* 3635; fruit bright orange, **7**; 3778.

Casuarineæ.

Casuarina montana, *Miq.* 3514, ♂, slopes of valley of Waimatang Kaimauk, 3200 ft., 3746, **8**; 3836, **10 a**; ♀, **1**.

Coniferæ.

Dacrydium sp. 3855, **10 b.**

Monocotyledones, by H. N. Ridley, M.A., F.L.S.

Hydrocharideæ.

Ottelia alismoides, *Rich.* (Coupang, R. Brown.)

Orchideæ.

Oberonia glandulifera, *Ridl.* (sp. nov.).—Acaulis, foliis ensiformibus equitantibus acutis 4-uncialibus; scapo gracili longo multifloro; floribus parvis subverticillatis; bracteis lanceolatis acutis serratis; sepalibus ovatis obtusis integris, petalis subsimilibus angustioribus; labello brevi lato carnosulo obscure 5-lobo, lobis lateralibus erectis columnam amplectentibus, lobo medio 3-lobo, lateralibus rotundatis obtusis, medio obscuro parvo obtuso, margine labelli in sinubus inter lobos lateral s et lobum me lium glanduloso; 3531, **7**; flowers greenish-yellow.

Liparis disticha, *Lindl.*

Liparis aurita, *Ridl.* (sp. nov.), 3714, **7**.—"Flowers orange and light red." Epiphyta, pseudobulbis parvis ovatis viridibus; foliis linearibus lanceolatis subacutis petiolatis; caulibus erectis gracilibus; bracteis dissitis ovatis acutis; floribus copiosis parvis; sepalibus linearibus lanceolatis; petalis linearibus; labello oblongo abrupte deflexo, costis duabus ad basin crassis, lobis lateralibus brevibus erectis cornutis, lobo medio oblongo, trilobo, lateralibus linearibus convolutis, intermedio breviore obtuso; columna brevi rectiuscula crassa, alis brevibus duabus; capsula pedicellata globosa.

Dendrobium affine, *Dec.*
macrophyllum (Veitchianum.) 3761, **9**.
granditlorum. *Ldl.* 3820, **10 b.**
calophyllum, *Rchb. fil.*

Spathoglottis plicata, *Bl.* 3504; sides of stream Maukuda, near station, **6**; 3923. near **10 ba.**

Cyrtopera bicolor. (Eulophia bicolor, *Bl.*)

Sarcanthus timoriensis, *Decne.*

Arides timorianum, *Miq.*

Vanda tricolor. *Lindl.*; 3794, **9**.

Tropidia curculigoides, *Bl.* Fowers white; 3795, **9**.

Microtis parviflora, *R. Br.* 3563, **6**. This species, of a typically Australian genus, occurs also in the Loyalty Islands, the Isle of Pines, New Caledonia and New Zealand.

Spiranthes australis, *R. Br.* 3824, 3825, 3862, **10 b.**

Caladenia javanica, Benn. MS. in Herb. Brit. Mus.; 3516 [errore 3506] **6**. "Among grass on rocky slope, **8**."—Terrestris, caule erecto hispido; folio singulo lineari; bracteis brevibus ovatis lanceolatis acutis hispidis; floribus 2 parvis; pedicellis quam bractea brevioribus; sepalis oblongis lanceolatis brevibus acutis hispidis; petalis subæqualibus; labello lato costato purpureo, pustulis flavis ornato; columna curva purpureo-ornata, anthera apiculata. Allied to *C. carnea, R. Br.*

Thelymitra Forbesii, *Ridl.* (sp. nov.).—Terrestis, caule gracili, 5-unciali; folio singulo angusto lineari glabra 3-uncial i; vaginis caulinis 2; flore singulo; bractea ovario ferme æquante lanceolata acuta; sepalis lanceolatis linearibus acutis; petalis latioribus lanceolatis; columna brevi curva crassiuscula ciliata; labello late lanceolato punctato obtuso. Quite distinct from *T. javanica*, Bl., and most nearly approaching the *T. rubra* of Australia. 3509, **3**; flowers purple. Bare banks.

Diuris Fryana, *Ridl.* (sp. nov.), 3508; "flowers yellow"; near **2.**—Herba terrestris; tuberibus duobus ovatis; caule erecto gracili ½–1-pedali; foliis anguste linearibus acuminatis longis; floribus paucis 1–2 pedicellatis; pedicello longiusculo; bractea lanceolata longe acuminata; sepalo postico ovato-obtuso, basi paul'o angustato; lateralibus linearibus obtusis porrectis parallelis; petalis ovatis obtusis basi angustatis; labello elongato 3-lobo, lobis lateralibus obtusis crenulatis venosis erectis, medio longo obscure 3-lobo costis tribus, duabus lateralibus ad basin, una media ad apicem; marginibus labelli deflexis; columna brevi, alis majusculis, basi dilatata, non denticulata. This record extends the range of the genus Diuris, hitherto only known from Australia, to the Malayan region.

[I have taken the liberty of asking Mr. Ridley to name this interesting species in honour of the Rt. Hon. Lord Justice Fry, who during my travels in the East, expressed great interest in my observations, and who has given much attention to the Orchideæ and to the question of their fertilisation. H. O. F.]

Habenaria (Peristylus) timorensis, *Ridl.* (sp. nov.).—Terrestris, tubere oblongo, foliis basalibus duobus ovatis oblongis; vaginis 4-lanceolatis longe acuminatis; scapo subgracili vix pedale; racemo laxiusculo; floribus circiter 11 parvis; bracteis lanceolatis acuminatis; sepalo postico cucullato ovato acuminato, lateralibus lanceolatis acutis; petalibus subsimilibus angustioribus; labello obcuneato, breviter 3-lobo, basi petalis sepalisque adnatis, callo carnoso semicirculari, lobis lateralibus latis, medio brevi obtuso, calcare scrotiformi, apiculato columna brevissima; anthera lata, loculis parallelis, polliniis grosse granulosis, caudiculis brevibus; stigmate breviter bilobo. Its affinity is with *H. spiralis*, Wight. 3520, **6.** Flowers yellowish-green.

Habenaria Susannæ, *Benth.* 3137, **1**; very sweet nectar at tip of the nectary; nectaries $5\frac{1}{4}$-in. in average length. Fertilised by a species of *Ophiodes* and *Remigia virbia* moths.

grandis, *Benth.* 3142, **1.** Nectaries with sweet nectar; the anthers burst of themselves and pollen falls out as minute particles.

sp. aff. angustata, *Bl.*

Herminium angustifolium, *Benth.* In rocky spots, by side of a stream 3561, **6**; 3521, **6**; 3515, **6**; 3823, **10 b.**

Scitamineæ.

Globba strobilifera, *Zoll. Mor.* (R. Brown, Coupang.)
Hedychium coronarium, *Koen.* 3712 a, and. 4113, **7.**
Curcuma (prob. sp. nov.). 3146, **1.**
Costus speciosus, *L.* 3734, **8.**
Canna indica, *L.* 3750 and 4009, **8.** (R. Brown. Coupang.)
Musa paradisiaca, *L.*

Hypoxideæ.

Hypoxis aurea, *Lour.* (H. Franquevillei. *Miq.*).

hygrometrica, var. pratensis, *R. Br.* 3564, **6.** Hitherto only known from Australia.

Amaryllideæ.

Crinum asiaticum, *Roxb.*

Dioscoreaceæ.

Dioscorea globosa, *Roxb.* 3849, **10 a.**

pentaphylla, *Lam.* 6, 3689, **7**; 3900, **10 a.** ♀, 4080, ♂. (R. Brown, Coupang.)

Trichodesma zeylanica, *R. Br.* var.

Taccaceæ.

Tacca palmata, *Bl.* 3765, **9.**

pinnatifida, *Forst.* 4017, **9**; 3735. **8**; nom ind. "Telo."

Liliaceæ.

Smilax timorensis, *Bl.* 3741, **8.** The two pairs of umbels of flowers together serve clearly to distinguish it from *S. latifolia.*

anceps, *Willd.*—This Mascarine plant was said by Decaisne to have been collected in Timor by Riedlé and Guichenot. De Candolle says that the specimens on which Decaisne founded his species are without flowers and very doubtful. It seems more probable they belong to *S. timorensis*, and hardly likely that a plant known only from the Mascarine Islands and Madagascar should be found also in Timor.

Eustrephus timorensis, *Ridl.* (sp. nov.)—Frutex scandens, caulibus tenuibus; foliis *glabris* alternis lucidis striolatis sexcostatis lanceolatis minute apiculatis brevi-petiolatis; petiolis tortis; bracteis deciduis parvis vaginantibus ovatis purpurascentibus; inflorescentia composita *terminali* cymosa, pedicellis florum tenuibus; bacca subglobosa *nigra* pericarpio tenui; pulpa parva; seminibus 1–3 nigris lævibus politis, oblongis subtriangulatis, embryone in *medio* albuminis cornei parum curvo. This is a very interesting plant, of which unfortunately we have not the flowers. The only other species in the genus, *E. Brownii*, is a well-known Australian plant, with pink flowers and orange berries. 3530, **6.**

Laxmannia sessiliflora, *Decne.* Exclusively Australian genus.

Cordyline timoriensis, *Bl.*

Dracæna timorensis, *Kth.* (D. reflexa, Decaisne.)

Asparagus racemosus *W.* (Asparagopsis Decaisnei, Kth.) "Samodok nehau," native name. 3800, **9.**

Gloriosa superba, *L.* 3435, **1**; 3827, **10 a**. 3430, **1.**

Pontederiaceæ.

Monochoria vaginalis, *Decne.*

Commelinaceæ.

Aneilema nudiflorum, *R. Br.* 3548, **6**; 3789, **9.**

Cyanotis cristata, *R. and S.* 3724, **8.**

Palmæ.

Metroxylon Rumphii, *Mart.*

Areca catechu, *Roxb.*

Cocos nucifera, *L.*

Pandaneæ.

Freycinetia angustifolia, *Bl.* (R. Brown, Coupang.)

scandens, *Gaud.* 3577, **6.**

Pandanus sp.

Aroid-æ.

Typhonium divaricatum, *Decne.*

sp. fruit. (R. Brown, Coupang.).

Arisæma sp., in fruit only. 3633, **7.**

Remusatia vivipara, *Schott.* 3788, **9**; on calcareous rocks.

Rhaphidophora pertusa, *Schott.* (R. Brown, Coupang.)

Caladium esculentum, *Schott.* (R. Brown, Coupang.)

Amorphophallus campanulatus, *Decne.*

Cyperaceæ.

Cyperus hyalinus, *Vahl.* (R. Brown, Coupang.) A very rare plant, the only other known locality being in Madras.

compressus, *L.* (R. Brown, Coupang.)

globosus, *All.*

longifolius, *Poir.*

radiatus, *Vahl.*

scoparius, *Poir.*; an African and Mascarene plant.

venustus, *R. Br.*

pennatus, *Lam.*

Cyperus difformis, *L.*
auricomus, *Sieb.* (R. Brown, Coupang.)
rotundus, *L.* (R. Brown, Coupang.)
cuspidatus, *Vahl.* 3598. **7.**
ferax, *Rich.*
diffusus, *Vahl.* Kunstler.
umbellatus, *Benth.* 3540, **6.**
Kyllinga brevifolia, *Roth.* (Coupang, Home.) 3538, **6.**
monocephala, *Roth.*
Heleocharis capitata, *R. Br.*
Scirpus mucronatus, *L.*
supinus, *L.* (S. luzonensis, *Presl*; S. timorensis, *Kth.*)
Fimbristylis miliacea, *Vahl.*
ferruginea, *Vahl.*
complanata, *Link.*
communis, *Kth.* (R. Brown, Coupang.)
var. gracillima, n. var.
gracillima; foliis angustissimis glaucis; culmis subpedalibus tenuibus debilibus; spiculis parvis sæpius congestis pallidis, vaginis glabriusculis. 3539, **6.**
glomerata, *Nees.*
barbata, *Nees.*
Fuirena glomerata, *Vahl.*
Scleria scrobiculata *Nees.*
purpurascens, *Steudel.*

Gramineæ.

Paspalum scrobiculatum, *L.* 3472, **1.** (R. Brown, Coupang.)
orbiculare, *Forst.* 3162, **1.**
Eriochloa polystachya, *H. B. K.* (R. Brown, Coupang.)
Isachne minutula, *Kth.*
patens. *R. Br.* (R. Brown, Coupang.)
Panicum prostratum, *Lam.*, var. setigerum.
multinode, *Lam.*
fluitans, *Retz.*
colonum, *L.* (R. Brown, Coupang.)
accrescens, *Trin.*
sanguinale, *L.* (R. Brown, Coupang.)
javanicum, *Poir.* (R. Brown, Coupang.)
carinatum, *Presl.* (R. Brown, Coupang.)
propinquum, *R. Br.*
helopus, *Trin.*
cimicinum, *Retz.* (R. Brown, Coupang).
Setaria verticillata, *Beauv.* (R. Brown, Coupang.)
glauca, *Beauv.* (R. Brown, Coupang.) On red clay; 3427, 3428, **1**; 4081, **8.** I cannot distinguish these plants from *Panicum rubiginosum* of Steudel.
Oplismenus hirtellus, *Beauv.* (R. Brown, Coupang.)
compositus, *Beauv.* (R. Brown, Coupang.)
Spinifex squarrosus, *L.*
longifolius, *R. Br.*
Coix lachryma-Jobi, *L.*
Sclerachne punctata, *R. Br.* (R. Brown, Coupang; only once collected previously in Java by Horsfield.)
Zea mays, *L.* (Cult.; R. Brown.)
Saccharum stenophyllum, *Buse.*
ægyptiacum, *R. Br.* (R. Brown, Coupang).
officinale, *L.* (R. Brown's list, Coupang.)
Erianthus aureus, *Nees.*
Pogonatherum crinitum, *Beauv.* Coupang.
Rottboellia exaltata, *L.* (R. Brown, Coupang.)
Manisuris granularis, *Sw.*

Thelepogon elegans, *Roth.* (R. Brown, Coupang.)
Pollinia laxa, *Nees.*
Ischæmum rugosum, *Miq.*
mutcium, *L.*
Heteropogon contortus, *All.* (R. Brown, Coupang.)
insignia, *Thw.*
Chrysopogon aciculatus, *Trin.* (R. Brown, Coupang.)
Andropogon parviflorus, *Roxb.* (R. Brown, Coupang.)
serratus, *Retz.* (R. Brown, Coupang.)
Bladhii, *Retz.*
Leschenaultianum, *Dec.*
diversiflorus, *Steud.* (R. Brown, Coupang.)
Apluda aristata, *Roxb.* 4107, **1.**
Anthistiria frondosa, *R. Br.* (R. Brown, Coupang.)
ciliata. 3461, **1.**
pilifera, *Steud.*
Sorghum timoriense, *Buse.* 4092, **1.**
sp.? (R. Brown, Coupang.)
Aristida, sp. near cumingiana. 3463, **1.**
Sporobolus diandrus, *R. Br.* (R. Brown, Coupang.)
Trisetum antarcticum, var. densum. Exactly the form collected by Kirk, at Port Nicholson, North Island, New Zealand.
Cenchrus echinatus, *L.* (R. Brown, Coupang.)
Chloris truncata, *R. Br.*
radiata, *Sw.*
incompleta, *Roth.* (R. Brown, Coupang.)
barbata, *Sw.* (R. Brown, Coupang.)
sp. aff. barbata.
Eleusine indica, *Sw.* (R. Brown, Coupang.)
ægyptiaca, *Gaertn.* (R. Brown, Coupang.)
Cynodon dactylon, *L.*
Eragrostis Cumingii, *Steud.* (R. Brown, Coupang.)
rubens, *Lam.*
plumosa, *Retz.* (R. Brown, Coupang.)
hapalantha, *Trin.*
Koenigii, *Nees.*
flexuosa, *Roxb.*
multiflora, *Roxb.*
amabilis, *L.* (R. Brown, Coupang.)
megastachya, *Nees.*
Centotheca lappacea, *Beauv.* (R. Brown, Coupang.)
Lepturus repens, *R. Br.* (R. Brown, Coupang.)

FILICES, by W. CARRUTHERS, F.R.S., F.L.S.

Gleichenia dichotoma, *Willd.* 3181, **1.**
Hymenophyllum dilatatum, *Sw.* 3866, **10 b.**
Trichomanes saxifragoides, *Pr.* 3946, **6.**
rigidum, *Sw.* 3475, **1.**
Lindsæa ensifolia, *Sw.* 3479, **1.**
Adiantum lunulatum, *Burm.* 3434, **1**; 3560, **6**; 3615, **7**; 3753, **8.**
rhizophorum, *Sw.* 3527, **6**; 3941, **6.**
hispidulum, *Sw.* 3476, **1**; 3593, **7.**
Cheilanthes farinosa, *Kaulf.* 3526, 4071, **6.**
tenuifolia, *Sw.* 3445, **1.**
Onychium lucidum, *Spreng.* 3562, **6.**
Pellæa geraniifolia, *Fée.* 3716, near **8**; 4044, **7.**
paradoxa, *Hook.* 3918, **10 b.**
Pteris longifolia, *L.* 3690, **7.**
venusta, *Kze.* 4049, **7.**
crenata, *Sw.* 3717, near **8.**

Pteris pyrophylla, *Bl.* 4097, **1.**
nemoralis, *Willd.* 3469, **1.**
quadriaurita, *Retz.* 3583, **6**; 3694, **7**; 3948, **7**; 4005, **1.**
Doodia dives, *Kze.* 3701, **7**; 3927.
Asplenium lunulatum, *Sw.* 3867, **10 b.**
falcatum, *Lam.* 3692, **7.**
caudatum, *Forst.* 4063, **10 b.**
diaphanum, *Bl.* 3864. **10 b.**
stercophyllum, *Kze.* 3596, **7.**
japonicum, *Thunb.* 3607, **7.**
Aspidium aculeatum, *Sw.* 3926, 3949, **7.**
aristatum, *Sw.* 3606, **7.**
Nephrodium unitum, *R. Br.* 3581, **6.**
pteroides, *J. Sm.* 4095, **1.**
Nephrolepis acuta, *Presl.* 3689, **7.**
Oleandra neriiformis, *Cav.* 3482, **1.** 3693; on rocks, **7.**
Polypodium subauriculatum, *Bl.* 3565, 3568, **6.**
Notholæna hirsuta, *Desv.* 3688; in crevices of rocks, **7**; 3937, **8.**
Gymnogramme involuta, *Don.* 3594, **7.**
Vittaria elongata, *Sw.* (3642) 3632, **7**; 3920, 4094, **10 b.**
Acrostichum spicatum, *Linn.* 3594, **7**; 3902, 3944, **10 b.**
"Ophioglossum sp." H. O. F., see p. 447.

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